SCIENTIFIC AMERICAN

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. XVII.—No. 5. [NEW SERIES.] NEW YORK, AUGUST 3, 1867. $3 per Annum [IN ADVANCE.]

Improved Cannon.

Fig. 1 represents a vertical longitudinal section.

Fig. 2 is a cross section through one accelerator.

Scale—Half an inch equals one foot.

If the gun is eighteen feet long and the bore is six inches diameter, it weighs 33,000 lbs.

Shot—300 lbs. Powder—100 to 120 lbs.

Initial or breech charge—5 lbs. very slow mammoth.

First accelerator—25 lbs. mammoth.

Second accelerator—25 or 30 lbs. No. 7.

Third accelerator—25 or 30 lbs. cannon or mortar.

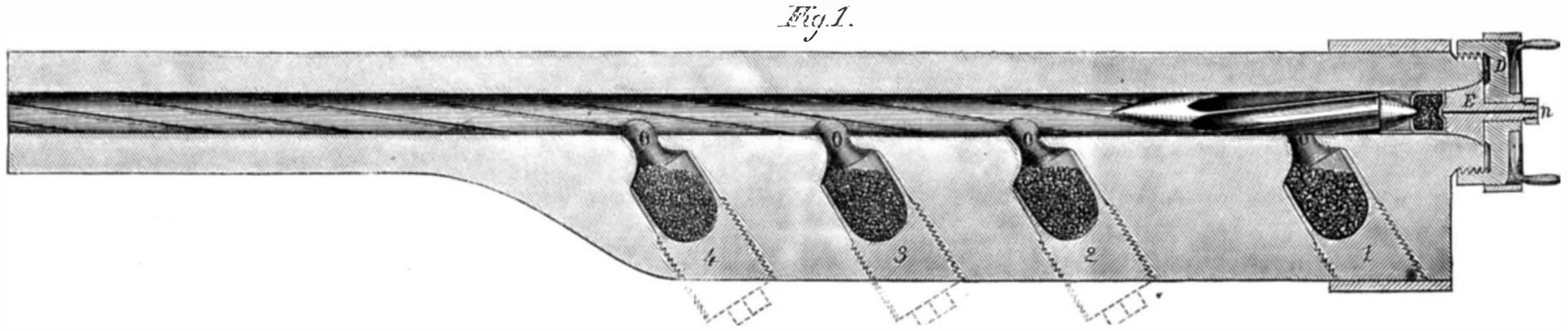
OPERATION.

When the gun is fired the shot is driven by the initial charge past the first accelerator, when the fire sets back down into and lights the mammoth powder in this accelerator. This raises the pressure perhaps nearly as high as it was raised by the small initial charge before the inertia of the shot was overcome. The action of each of the remaining accelerators is the same. It is found by experiment that every additional accelerator increases the force of the shot, and every addition to the charge in the last accelerator seems to increase the force of the shot as much as though it was

RANGES OF CANNON.

	Diameter of Bore.	Elevation. 2°.	5°.	10°.
	Inches.	Yards.	Yards.	Yards.
Old 12-pounder, round ball	..	909	1,663	....
Old 42-pounder, round ball	..	1,010	1,995	....
Rodman's 400-pounder in use on monitors, with 40 lbs. of good powder	15	812	1,518	2,425
Parrott's 10-pounder	2·9	930	2,000	3,200
Parrott's 20-pounder	3·64	950	2,100	3,350
Parrott's 30-pounder	4·2	1,000	2,200	3,500
Common rifle with—				
James shot, 30-pounder	4·2	1,000	2,200	3,500
Sawyer's, 30-pounder	4·2	1,000	2,200	3,500
Hotchkiss shot, 30-pounder	4·2	1,000	2,200	3,500
Armstrong's rifle, 12-pounder	..	1,200	2,260	....
Whitworth's, 12-pounder	3·25	1,254	2,330	....
Accelerator, 12-pounder	2·55	1,590	3,584	....

Fig. 1.



A. S. LYMAN'S PATENT ACCELERATING CANNON.

Fourth accelerator—25 or 30 lbs. mortar or musket.

The accelerator plugs, 1, 2, 3, 4, may be made of soft cast steel fitting closely in and protecting the cast iron from the fire of the powder. Instead of these steel chambers, ordinary plugs only half the diameter of the powder chambers, as shown in Fig. 4, have heretofore been used, but though no cast-iron accelerating chamber has ever failed, it is believed that a protection of half an inch of soft steel, as shown—which will keep the fire out of any defect that may exist in the cast iron—will increase its durability.

The breech-loading arrangement consists of a cap, D, and is screwed on the outside of the breech like Whitworth's, but in front of this cap is the tapered plug, E, with its stem projecting back through the cap, and with the nut, *n*, on its end, so as to leave sufficient play, that when we open the breech the cap will make half a turn before it strikes this nut and lifts the plug from its seat, without necessarily revolving it at the same time. This greatly lessens the friction and the power required to open the breech.

added to the first accelerator or to the charge in the breech.

Though this breech-loading arrangement is somewhat similar to that of Mr. Whitworth's cannon, it is believed to be a much safer arrangement, for the following reasons:—

1st, When the gun is fired there is no pressure in the barrel within six inches of the end of the tube, and that six inches acts as a band to strengthen the tube.

2d, As we use not over one quarter as much powder in the breech, the pressure of the fire acts against not over one quarter as much of the length of the bore of the gun before the shot starts.

3d, The sabot in this accelerator prevents the fire of the powder from pressing around the shot, and the back nine inches of the shot is freed on its bearings, so that the strain from rotating the shot falls entirely on the bearings in front. The part of the gun that is strained by the pressure of the fire is thus separated a considerable distance from the part that is strained in rotating the shot. This separation of these two strains by nine inches of metal on which there is no strain,

The ranges of Parrott's rifles are copied from his Handbook. The range of the Accelerator is copied from the official records of the Navy Ordnance Bureau at Washington.

It will be seen by Benton's *Ordnance and Gunnery*, page 521, from which the above ranges of smooth bores are copied, that the 15-inch gun with 40 lbs. of good powder, not mammoth or rocket mixture, at 15° elevation, ranges but an average of 3,078 yards, which is 500 yards less than the 12-pounder Accelerator at 5°. With an elevation of 25°, it ranges 4,528 yards. Increasing the charge of powder to 50 lbs. increases the average range to only 4,680 yards—that is, but 152 yards, or 3¼ per cent. If this 25 per cent addition of powder had been burned in an additional accelerating chamber, it would have increased its range several times as much. It is often proposed to apply the accelerator to smooth-bore cannon, but their inaccuracy is an insuperable objection. Exchanging the rifled accelerator for the smooth bore would be like the prairie deer hunter who should throw aside his good American hunting rifle for the old smooth boremusket with its round ball

Fig. 2

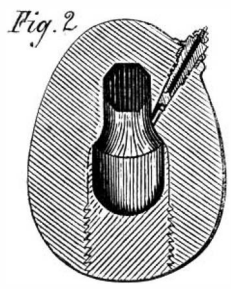


Fig. 3.

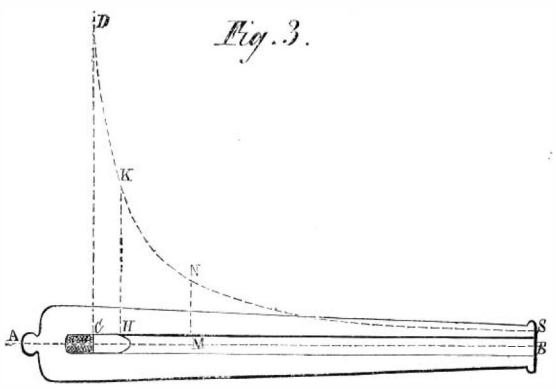
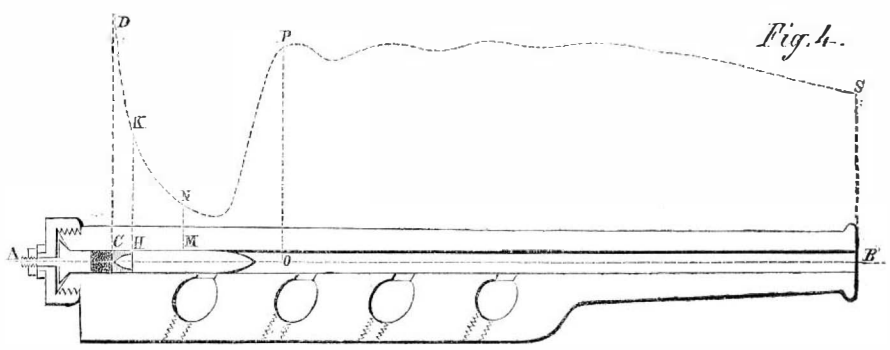


Fig. 4.



The initial charge is in a metallic cartridge made heavy around the back edges, so as to insure against the possibility of any leak around the plug. It will be perceived that though this plug is pushed back even the $\frac{1}{64}$ of an inch when the gun is fired, the space around the end of the plug next to the powder will not be perceptibly enlarged, while in the Whitworth cannon, if the cap is driven back the $\frac{1}{64}$ of an inch when the gun is fired there will be an opening the $\frac{1}{64}$ of an inch wide on all sides between the cap and the breech end of the gun. We have seen one of these cannon at the Washington Navy Yard with deep grooves cut across the end of the tube from this cause.

The sabot may be made of copper or sheet brass tube, filled with paper pulp and nearly as long as the tapered end of the shot. We have often with some forms of shot dispensed with the sabot. The valve openings—see Fig. 2—through which the accelerators are loaded, need not be over an inch in diameter for common cannon powder, but for the first accelerator, which is charged with mammoth powder, this valve should be about two inches in diameter. A copper cup on its end prevents windage. The valve stem projects up through the hollow screw with a cap nut on its end which keeps out water in case of rain, and like the breech plug is so arranged that when the screw has made about half a turn, it strikes the cap and lifts the valve from its seat, without revolving it, thus saving friction.

greatly lessens the danger of bursting the gun and removes the objection to the wedge action of the Whitworth shot, or any other shot that centers in the gun, as well as the objections to the large class of shot that are rotated by the sabot, or by a ring of softer metal.

It is believed that this breech will endure a greater pressure than the breech of a muzzle-loading gun. All the pressure on the breech pin is borne by the screw on the outside of the breech, where it is over forty inches in circumference, and free from the action of the fire, while in the muzzle-loader the strain acts first on the inside of the bore, where it is less than nineteen inches in circumference, and if any defect exists, the fire under heavy pressure enters it and increases the effect. It also enables us to use the metallic cartridge, which protects the powder chamber from the direct action of the fire.

The Whitworth bore is peculiarly adapted to the accelerator, as the shot is driven forward at the muzzle with very nearly as much force as at the breech, and is thus caused to center and be held very steadily in the gun as it leaves the muzzle. For this reason, though the shot is made smaller than the bore, so that it will enter freely without cleaning the gun, it is as accurate as the common form of grooves and jackets can be, even where they fit so closely as to necessitate very careful cleaning of the gun at each discharge. This fact has been thoroughly tested with small accelerating rifles.

COMPARISON OF THE POWER OF ACCELERATORS WITH THAT OF OTHER GUNS.

Fig. 3 is a diagram from Robbins' *Principles of Gunnery*, for showing the pressure applied to the ball in different parts of the bore of the gun. He supposed the powder to be in moderate quantity and of good quality, and all converted into an elastic fluid before the shot left its seat. Let A B represent the axis of the gun. Let the perpendicular, C D, represent the pressure of the fire on the shot at the moment it leaves its seat. Then when the shot is driven forward so that the gas from the powder has doubled its bulk, the pressure is reduced to one half (on account of the cooling of the gas by expansion, it would practically be reduced far below one half, but as there was probably some powder not consumed, we will represent it as one half), and its pressure will be represented by the perpendicular H K. When it has expanded into four times its original space the pressure will be represented by the perpendicular, M N, and the line, D K N S, drawn through the top of all the perpendiculars representing the pressures, would be a hyperbola. Now these perpendiculars representing the pressures at the points from which they are drawn, the area of the figure, D K N S B C, would represent the power applied to the ball.

It was reflecting on this diagram and its demonstration by Robbins that first suggested the idea of an accelerating gun. Practically, with common cannon it is found that while the

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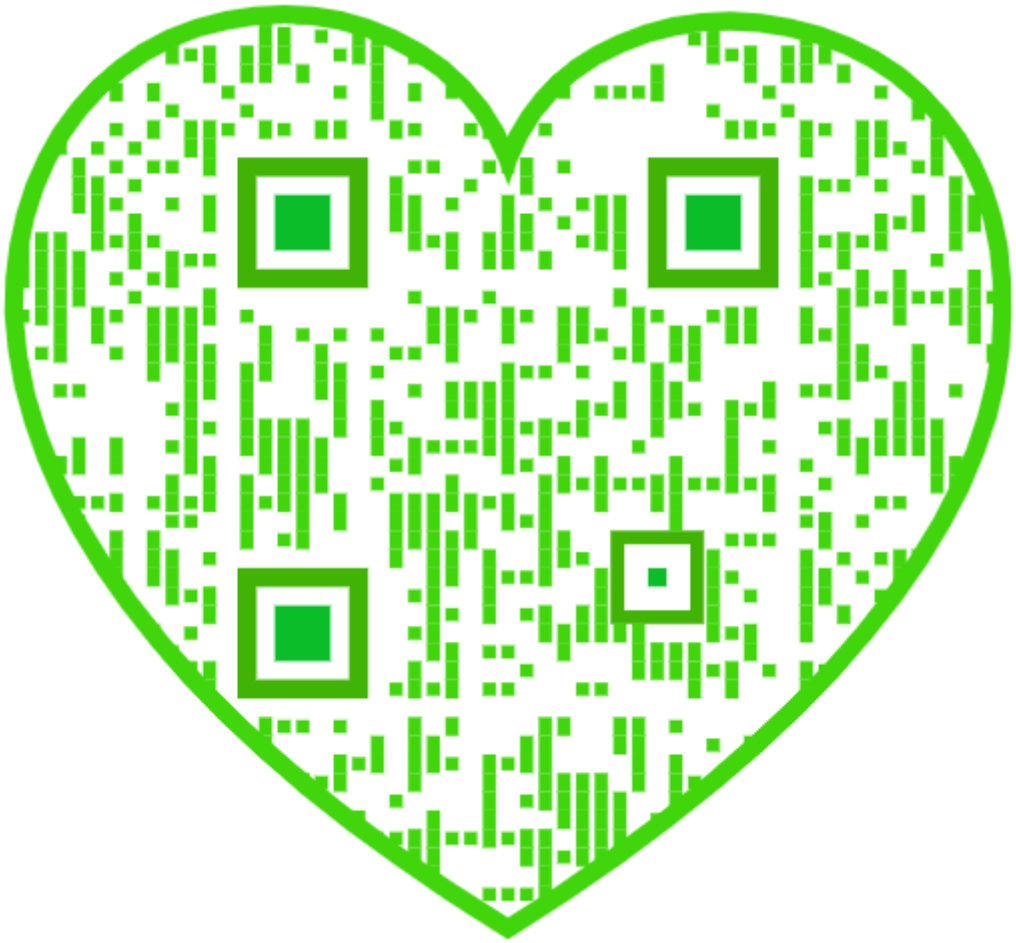

strain at the breech is enormous, the pressure before the shot leaves the muzzle is but little, and where the gun is long, even less than the resistance of the air which is packed before it. For this reason shortening the barrel often increases the force of the shot.

Fig. 4 shows the diagram described by an Accelerator. In this we must use a small quantity, and very slow powder, at the breech for the initial charge, because we use a long, heavy shot. Then when the curve has run down considerably and the shot is well under way, it passes over the first accelerator, containing perhaps ten times as much as the initial charge. The fire sets back, down into, and lights this, and raises the pressure or curve nearly as high as the perpendicular made by the initial charge.

When this accelerating charge is fired, instead of their being only three or four inches depth of elastic fluid in the breech to expand, there is over ten times as much, and the curve runs down less than one tenth as fast. When it passes over the second accelerator it fires another large quantity of powder, and the curve runs down still more slowly, and the area of the figure included between this curve, the perpendiculars, C D and B S, at each end, and the axis, A B, of the gun, which area represents the power applied to the ball, may be ten or twenty times as great as in the first case, while the pressure in the barrel of the Accelerator is not over one half or three fourths as great.

A good practical illustration of the difference between the Accelerator and one of the best cannon on the old principle (that is one of the best guns that does all its work with one blow or one charge of powder), was shown in our own experiment in the Navy Yard in Washington. It was said by the officer in charge that the most powerful gun they ever had there for penetration was the Whitworth muzzle-loader, 5½ inches diameter of bore—a gun made by shrinking bands of steel upon a core of steel.

They had tested this gun upon the same plate upon which they tested the 2½-inch bore Accelerator. The shot of this Whitworth gun was cast steel, about 12½ inches or 2½ diameters long; the propelling power was 14 lbs. of powder (No. 7), which, with the cartridge bag, filled the gun about 20 inches deep. The target was a very perfect plate, 10 feet long, 3 feet wide, and 5 inches thick, backed by 18 inches of solid oak. The shot penetrated 3½ inches into this 5-inch plate. Next they fired a similar shot with 18 lbs. of powder (No. 7), which filled the gun over 2 feet deep. As the Whitworth gun uses a cake of beeswax and tallow for a wad, there was very little windage, but perhaps nearly the whole of that long column of strong powder was converted into an elastic fluid, as heavy as water and hotter than melted iron, before the inertia of the shot was overcome. Or it may be, as believed by some, that only a foot or so of the column was burned, while another foot next to the shot was rammed into a cake as hard as dry pressed brick, and not burned until it left the gun. This would make a very obstinate sabot, particularly if the bore was rough.

The shot penetrated but 3¼ inches, and that splendid Whitworth gun was ruined. It was cracked along its top several feet. There were no other shot marks on this plate except the two Whitworth, which were still sticking in it, and though it was a very perfect plate, it was supposed the solid oak backing only, prevented their passing through.

The Accelerator had but 4 inches depth, ¾ lb., of mammoth powder in the breech, but it had enough of the strongest cannon powder in the chambers to have filled the bore 30 inches deep. The shot was 17½ inches or about 7 diameters long. The twist of bore being 1 revolution in 3 feet, keeps this long shot point on. The gun stood at the same port hole that had been occupied by the Whitworth, in the battery 204 yards from the target, which was standing in the water. The shot passed through the 5-inch iron plate, the 18 inches of solid oak, a brace behind it about a foot thick, in which it broke off a 1-inch bolt. The brace was standing at such an angle as to tend to glance the shot downward, but it went on about 100 yards. No other gun in the world would have thrown that shot that distance with the same elevation —about 304 yards with 15 minutes elevation—even if the target had been out of the way.

Now instead of using but 18 lbs. of good strong powder in a 5½-inch bore gun, as was used in that Whitworth gun, which filled it 25 inches deep and spoiled it, we would use five or eight times 18 lbs. in the accelerators, which would be enough to fill the bore from 9 to 14 feet deep, if it was in the bore of the gun. That and the shot would more than fill the gun. But the powder being all in the accelerators except the 3 lbs. of very slow powder, it fills the bore but 4 inches deep, and though the pressure is not raised one fourth as high in the Accelerator, the power exerted is five or eight times as great as it was in the Whitworth cannon.

It was thought to be unsafe to fire this 12-pounder (2·55-inch bore) Accelerator at a higher elevation than 5° at the Navy Yard, and it was never fired excepting there. But from its comparative ranges at 2° and 5° we can approximate to its comparative range at higher elevations. While at 2° its range exceeds that of Armstrong's 12-pounder by but 32½ per cent, and Parrott's 2·9-inch bore gun but 70 per cent, at 5° it outranges the Armstrong 58·6 per cent, and the Parrott 79 per cent. The reason for this comparative increase of range for every increase of elevation, is the fact that our shot are more than twice as long and heavy as Armstrong's or Parrott's in proportion to their diameter, and therefore meet with much less resistance from the air in proportion to their momentum, notwithstanding their higher velocity.

With good rifles aimed by practiced gunners the principal cause of inaccurate shooting—when the exact distance is not known, as in hunting or in battle, and particularly when vessels are changing their distances—is misjudging the distance. While with the ordinary rifle cannon at a distance of 1,500 yards, the shot falls 1 foot in 7 or 8 feet, it is found that with the 12-pounder Accelerator the shot falls but 1 foot in 46 feet; that is, the common rifle shot falls as much (30 feet) in 70 or 80 yards as the Accelerator rifle shot falls in 460 yards, and a practiced gunner would misjudge his distance as much as 70 or 80 yards in 1,500 yards, probably a hundred times where he would misjudge it once by as much as 460 yards, and therefore throw his shot 30 feet over or under the point aimed at as many as one hundred times, when using the common rifle cannon, where he would once with the Accelerator.

Sir Howard Douglas, in his work on gunnery, page 532, remarks:—"In all cases of gunnery the great object is to have the path of the shot as nearly horizontal as possible;" and again, page 367:—"No law of gunnery is more clearly demonstrated and irrefutable than this, that elevation is inversely the exponent of accuracy;" "The gun that makes the greatest range with the least elevation, and consequently with the greatest horizontality in the flight of its shot, is assuredly the most accurate in its practice and the most destructive in its effects."

If this 6-inch shot, propelled by 120 lbs. of powder, of which 90 lbs. is quick and strong, averages 1,666 feet per second with 5° elevation (and it will more than that if properly modeled for overcoming the resistance of the air), it will range 5,000 yards; that is more than twice as far as any other gun, and more than three times as far as the 15 or 20-inch bore gun of the monitors. At 5° elevation, or 5,000 yards, it will penetrate at least 16 inches of iron plate and 4 feet of oak; that is, it will pass through and from side to side of any iron-clad vessel that can be floated.

The limit of the elevation of the 15 and 20-inch guns on the monitors is 6°, and their greatest range is less than 2,000 yards.

It is evident that two or three active wooden merchant vessels, properly prepared and each armed with one or two of these Accelerators, would destroy a whole fleet of monitors or slow iron-clads without allowing them to approach near enough to roll their 15 or 20-inch shot within half a mile of them, or endanger them in the least in any way.

A. S. Lyman, 212 Second avenue.

A TRIP FROM LONDON TO AMSTERDAM.

Amsterdam, June 30, 1867.

Before setting out upon my continental tour I passed a week in London, which was a most happy relief after the bustle and confusion of Paris. Aside, however, from this, the contrast between the two cities is very striking. Paris, the center of all that is brilliant and gay, the seat of art and fashion; London, dark and sombre, the center of the commercial world, where every one seems involved in trade and traffic. The Londoners are very unhappy just at this time, and are growling about the peculiar freak of the Royal mother. They read every day in the daily papers how Louis Napoleon is gathering emperors, kings, sultans, viceroys and princes at the Imperial Palace, bringing all the world to witness the festivities, while their own dear Queen in the hight of the London season, is away off at Balmoral, in Scotland, apparently as unconcerned as a peasant girl of all that is going on in the Great Metropolis.

To compensate, however, for what seems to be a strange anomaly in her conduct, the Royal mother orders her dutiful son, the Prince of Wales, to hold "drawing rooms" and urgently requests that all persons who are presented to the Prince shall consider themselves as having been presented to Her Majesty. The dutiful subjects are bothered a good deal how to explain this curious state of things and begin to hint that somebody's head may be a little out of gear. I believe, however, that the Sultan of Turkey has promised to go to London and the appearance of the great Mahommedan will serve to smooth down the ruffled fur of the growling Britons.

Leaving London by the Chatham and Dover Railways, which seem to have come near to a state of utter ruin by the bad management of its directors, I journeyed to this quaint old Dutch city, by way of Brussels, Antwerp, Rotterdam, and the Hague. Holland is a new country to me, and although easily accessible by steamers and railway it is usually passed by travelers, who seem to prefer the more grand and picturesque countries of Switzerland and the Rhine, where the eye is feasted by all that is sublime and beautiful in nature and of art made impressive by the lapse of centuries. Through all the western portion of Belgium, the country is very beautiful in its cultivation, not exceeded by that of any other country in Europe, and as regards its manufacturing and industrial interests Belgium is making great progress. Above Antwerp the soil in many places seems quite barren and unproductive, but the people appear to be happy and contented and prefer not to be swallowed up by their stranger neighbors. At Moerdyk, a steamer takes the railway passengers to Rotterdam by the river Meuse, which is one of the most agreeable trips in Europe, owing to the singular character of the scenery which lies stretched out on either side. It is generally known that a large part of Holland is formed of the alluvium deposited by the Rhine and its confluents. Hudibras describes Holland as a country that draws fifty feet of water, which is literally true, but by an almost superhuman amount of labor, and an expenditure of £300,000,000 sterling, these industrious Dutchmen have reclaimed the whole kingdom, and made it productive to the highest degree. Canals and ditches intersect and cut up the surface of the country in every direction even to the subdivision of farm lands into "polders," so that the milkmaid is often seen towing her boat load of polished milk cans to the pasture to obtain the daily supply of milk. I have also frequently noticed during their hay season that the farmers transport their hay in flat boats along their little farm canals. The whole country abounds in cattle and sheep, the cattle being uniformly black and white.

On the larger canals a great many sail vessels are employed, which, owing to the flat country, appear to be sailing on dry land, and still more singular it is to see them frequently floating along higher than the tops of the little cottages. Another singular feature of the country is the vast number of clumsy old windmills which are continually sweeping their long lazy-going arms through the air. These mills are used for grinding, sawing, and other mechanical purposes, but chiefly for draining the water from the low lands and pumping it into the canals, thereby preventing the inundation of the country. To the people of Holland, these old windmills must be looked upon with a veneration similar to that felt by the Egyptians for the sacred Ibis. I do not see why this same class of windmills could not be profitably employed upon our Western prairies where wind is plenty and cheap, and where it is not possible to obtain water power for grinding grain and other domestic uses.

The streets of the cities of Rotterdam, the Hague, and Amsterdam, have also the same system of canals running through them, and these latter are made very useful for transporting market produce and other merchandise from point to point. The Dutch being proverbial for their thrift and cleanliness, the traveler will look in vain for ruins or other evidences of decay which characterize some portions of Germany, and if the people were not very careful in the management of this net-work of canals, I am sure they would rapidly die off from the effects of malarious diseases. The water in these canals is covered by a green scum, which, upon close examination, proves to be a little water plant of the confervæ species which floats upon the surface and draws its life from the vegetable matter which accumulates in great abundance.

I spent two delightful days at the Hague. It is the capital of the country and contains the palaces of the King, Queen, princes and nobles. Many retired gentlemen of fortune also reside here. The Museum of the Hague is one of the richest in the world, especially in objects of rare curiosity obtained from Japan and the East Indies. Prominent among this rare collection of ancient things that interested me, was a small, elegant cannon of silver and gold, which was presented by the Society of Commerce of the Hague to Admiral De Ruyter. It is a rifled gun, which shows that the principle of rifling was applied to cannon nearly two hundred years ago. There is also a very old breech-loading cannon having a removable breech pin made on the same plan as the one illustrated in Bennett's work on ordnance. The art gallery contains fine pictures by Reubens, Vandyke, Jordaens, Teniers, Matsys, Gerard, Douw, Guido, Reni, Murillo, and other great masters. There are two pictures in this gallery which have made it famous the world over, the subjects being as unlike as it would be possible to make them. I refer to Paul Potter's *Bull*, and to Rembrant's *Lesson in Anatomy*. These wonderful pictures were painted upward of two hundred years ago, and to all appearance are as bright as when first finished. The Dutchmen think a great deal of Paul Potter's *Bull*, and it is said that the Dutch Government offered Napoleon a hundred thousand dollars rather than that the picture should be taken from them and carried to Paris. In these two great paintings, art appears to have done all that it is possible to do short of actual creation. This Museum and the palaces here bear evidence of the intimate trade which so long existed between these people and the Japanese. When our party reached "Hotel Bellevue" the waiters made their appearance in white neckcloths and gloves. It occurred to us at once that we had struck upon a little more style than we had met with elsewhere, but we soon found out that a large wedding party was expected to dine there that evening. An event of so much interest in a foreign country naturally excited our curiosity, and upon the assembling of the guests, expecting, of course to see the happy couple, I was informed that the marriage would not take place for several days. It is the custom in Holland that when parties engage to marry, they repair to the magistrate's office and sign a contract of betrothal. The notice must be published fifteen days, during which time the family of the affianced parties give a series of entertainments of various sorts. The dinner to which I have alluded, was given in the most sumptuous manner by the young lady's mother. I remarked to the landlady of the hotel, "supposing after all the fuss and expense, one of the parties should get sick of the bargain, and, as was sometimes the case in the United States, should fail to put in an appearance on the wedding day?" This idea struck her as exceedingly novel, and impossible in Holland, where the people appear to be very honest, happy, and industrious.

Amsterdam stands literally upon piles, and many of the buildings look as though they intended to tumble down. The greatest degree of skill in hydraulic engineering has been required to manage the water so as to prevent the city from being submerged, a calamity to which it is exposed at all times. It is not easy for its inhabitants to abolish old notions, so that occasionally one will see a very respectable coach-body mounted upon wooden runners, the driver holding in his hand, by a piece of bed cord, a greased rag, which he throws occasionally under the runners to lubricate them so as to pass easily over the pavements. I saw one of these vehicles this morning and cannot imagine anything more ridiculous.

I have also visited the famous town of Broek, which has the reputation of being the cleanest place in the world. Carriages are not permitted in the streets; smokers were once warned to put stoppers on their pipes, and from motives of cleanliness the cow's tails were tied up, when within doors. I think that some of these absurd notions must have gone out of fashion, but it is a remarkably neat little place, where good cheese, milk, butter, beer, and bad cigars can be had cheap for cash, but no trust.

S. H. W.

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THE GREAT EXPOSITION COMPLETE.

Doctor Prime, under the *nomme de plume* of "Irenæus," has written to the New York *Observer* some of the best letters from Paris, descriptive of the Exposition, that have been published. We make the following extracts from his last letter.

At last it may be fairly and truthfully said the Exposition is complete. Every department is open and full. The sound of the hammer has ceased in the Palace of Industry and Art. No more doth the workman in his blouse, with his ladders and brushes, his car and his bars, jostle among the silks and the laces of the gay and the fair who throng the walks and niches of the grand bazaar. It is done. The world is here to see it. The kings of the earth, with their queens: the great men of the East with their wives and their concubines: princes and princesses, generals and captains, and ambassadors and commissioners, and men of high and low and no degree; deputations of the laboring classes from various countries; schools of young men and young women on excursions of pleasure; regiments of soldiers on a holiday, in picturesque uniform, from the mountains of the Tyrol; students from the German universities, a w ld rollicking set of fellows who play as hard when they are abroad as some of them study when they are at home; Chinese and Japanese, and Turks and Greeks, and Russians, in great numbers, and Fins and Poles, and Swedes and Danes, and coal-black Africans and keen, sharp-set Yankees and Brazilians, and gay Italians and solemn Spaniards and Portuguese, and how many more I do not this moment remember; but assuredly all the civilized the semi-civilized and some of the uncivilized peoples of the earth have their representatives at this moment in the capital, the metropolis of art, the most beautiful, attractive, seductive, dangerous, destructive, delightful city in the world.

Around the central garden stands the great Exposition building itself, and over its several doors are the names of the streets that divide it into sections, and of the countries to which they lead. Standing in the garden we read the names of all the nations and select the one we wish first to explore. Now that I have taken you with me through the most of them separately, it is well to go through the walks, making successive voyages or travels around the world, passing constantly out of one land into another and making comparisons among them. It is thus that we get one grand impression of the whole. If at any time in the slow and imperfect development of the display, we have been tempted to regard it as a failure, now that all its proportions are revealed and the completed idea made a fixed and tangible fact, no one can call it a failure unless he had made such exaggerated previous conceptions that a city of pearls and gold would fail to satisfy his expectations. The outer circle is alive with the movements of useful art—the machinery by which the work, the hard work of the world is done. The inmost circle is the repository of the fine art—the paintings and statuary—of the several nations. Between these are many concentric circles, divided and sub-divided, into convenient compartments, in which all the results of human ingenuity and labor, whatever the wants, real or imaginary, of mankind demand, are assembled. It is not too much to say that so great a collection was probably never made before. Forty thousand persons are enrolled as exhibitors! Each of these has sent something, and many of them many things, which the Judges deemed of sufficient interest to be placed in competition with the rest. All together, the number of objects exceeds one million! Whatever, therefore, is admirable for its power to benefit or gratify the human race, whatever tends to exalt, improve, please and bless, distinguishing the human from the merely animal races, is therefore here, in its most elaborately finished form. We know somewhat of the games and fairs that brought kings and peoples into contact and competition in Greece and Italy, and Asia Minor in the days of old; we know that Damascus and Babylon, Bagdad and Cairo have had their streets and squares and bazaars thronged with millions of people to see and buy and sell: but never until railroads and steamers could be used to transport the productions of the earth from its most distant points to a common center, has it been possible to gather in one enclosure such a million of various fabrics as are now visible in one day, within this Park in Paris. The one chamber of diamonds exceeds description: a room full of precious stones, in every form of art, to adorn the women whose highest type of beauty is to need no other jewel. Yet it is not so much the brilliancy and excellence of one or another of these departments of art that gives the character to the Exhibition. True, you will not find in any shop or street such specimens of silks in piece and in dresses, such patterns of gold and silver ware, such porcelain in all the shapes that luxury and taste can devise or want require, such glass and crystal in every range of ornament and use, such wealth of wool and cotton wrought by hand and machinery into all the purposes of life, such instruments of music peculiar to certain lands and others common to all, but vieing with each other in splendor of finish and perfection of tone; such manifold productions of the earth, vegetable and mineral; such enginery to move the works that produced these various articles for man's use, and make man the master of the land, the air and the sea, the elements themselves being made subservient to his will. But you must take them all in at once in combining the results and effect of this Exhibition, and reflect that a sample of the best of everything is here under one roof, and may be seen for twenty cents! Such an Exposition was never made before, and it is quite doubtful whether another will be attempted during the present generation.

And outside of the building, in the Park itself, is a more picturesque and exciting show than that within. There by the erection and decoration of buildings representing forms of life at home, various nations have sought to show them selves, or some types of themselves, in Paris. If they are not more correct and true to facts than the ridiculous American farm house and school house, they are simply an imposition on the public. But we will hope that these Swedish and Russian and Swiss dwellings are somewhat like those in the countries they represent, while this United States farm-house is such a building as I never saw, and I have seen several. China has its pagoda and temple and theater and tea room. Egypt its palace, and Turkey its mosque, and Tunis its Royal residence.

Almost every nationality has a restaurant. The American offers buckwheat cakes, with sirup. We call for them—six leathery, burnt, heavy, sour, loathsome looking plaisters are laid before us, and some sugar dissolved in water, to imitate sirup. I called the manager, and, in terms of deep concern, addressed him: "Sir, do you expect American, Christian gentlemen to eat those vile things, and think them buckwheat cakes? For the honor of your country, I besech you, as a patriot, to give them some other name, or suspend the business." He made many apologies, and promised to make better cakes. I have no confidence that he will succeed.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Cause of Guns Bursting.

MESSRS. EDITORS:—I observed in your issue of May 18th an article headed "The Bursting of Cannon," to which allow me to make a few remarks in addition to those already given by you, which I think will be admitted by all who have given the subject much thought and attention, to show the most direct cause for the bursting of all fire-arms regardless of size.

The true reason of upsetting of soft leaden bullets and the fracture of hard metal ones, arise from one and the same cause. That is, counter pressure upon the shot, and to illustrate my position I will place a conical bullet upon its side horizontally upon an anvil, and with a bat held with both hands will give it a blow upon its butt end, the force of which the bullet would receive amounting to 30 lbs. weight which would send the bullet from its state of inertia in its curved orbit, meeting with only unconfined atmospheric resistance until it would fall upon the earth. We will now find the leaden bullet and upon examination see its original form and contour but slightly if any changed. We will now take another bullet of the same size and form, cast in the same mold, and place it upon the anvil with its point downward, and measure a blow from the bat vertically, imparting again the force of impact upon the base of the bullet (30 lbs. as before) driving it against the anvil with such a force that we find on examination, a complete case of upsetting of the bullet, it being knocked out of shape. much shortened, possessing little or none of its original shape.

Precisely the case with the bullet in the gun. It lies between counter forces; the gas of the powder behind the bullet and the column of atmosphere in front of it trying to hold it in its place; and when we take in consideration the 15 lbs. of atmospheric pressure to the square inch, and the utter impossibility for two substances occupying one space at the same time, we will at once see the application of the bullet between the anvil and the bat. The bullet in the gun being placed between two antagonisms, the powder gas being the stronger of the two the bullet begins to move before the expansive power of the powder gas, the atmosphere gives way inch by inch, and as it is susceptible to compression, those particles nearest the bullet, press in those toward the muzzle of the piece until it becomes so much condensed that the whole column begins to move before the onward march of the bullet, and at this particular moment the upsetting or fracture of the shot takes place. And this particular time is when fracture or bursting of the gun occurs; therefore the fundamental law in gunnery is to have the piece as short as possible in proportion to the caliber, the object being to get the barrel only sufficiently long that a necessary charge of powder will burn before the shot passes from the muzzle of the gun; for the longer the gun the greater the atmospheric resistance in front of the shot and the chances much augmented for bursting of the piece. I have made many experiments satisfactory to myself and am forced to the belief that the frequent bursting of fire-arms regardless of size of caliber is to a great extent the result of counter pressure upon the shot.

To illustrate or demonstrate further the retarding effect of a column of atmosphere upon a bullet in a rifle barrel weighing 12 lbs., caliber, 70 to the pound, with 2½-inch gage of powder, shooting 60 feet, I drove a conical bullet 13½ inches in a solid block of pine wood; and with the same gun on the same day, giving it the same treatment, save exhausting the atmosphere in front of the bullet, I have found my bullet driven in the same block of wood 23½ inches, with not more than one-fourth the recoil attending the first shot. In closing this article I will say that a goodly number of experiments that I have made all combine in affording me direct evidence that the range of fire-arms can be much increased, and that too by a less charge of powder, that their safety can be much augmented, if not wholly prevented from bursting, by exhausting the atmosphere in front of the bullet instantaneously with the discharge of the piece, so that the bullet travels in a vacuum until it passes from the gun and flies off in the open and unconfined air.

E. H. PARDEE, M. D.

San Francisco, Cal.

The Use of Shot in Rifles.

MESSRS. EDITORS:—Some time since I noticed an inquiry under the head of "Answers to Correspondents," respecting the use of shot in rifles. Your correspondent appeared to be a western man, and I judged that being compelled to use a rifle on the prairies for defense against Indians, or for the destruction of large animals, he also desired to be able to obtain grouse, duck, etc., for food, when hard pushed, and when large game was not to be found. With this supposition, I give the results of my experience in the wilderness. I use a Spencer carbine when in pursuit of large game, and as one gun, with accouterments, etc., is quite sufficient for one person to carry, have been compelled to use shot in the rifle, when I desired or was compelled to live on small game. Still, I have never yet been compelled to use loose shot. I put the shot up in stiff paper cartridges, which fit very loosely in the gun, so as not to take the grooves of the rifle, the cartridge being kept from slipping in the barrel by a light wad. Eley's wire shot cartridges will not do. I have used a cartridge of peculiar construction, of stiff pasteboard, calculated to resist the centrifugal force given by the grooves, and which scatters the shot—it is of doubtful utility, and I shall not trouble you by describing it. It must not be understood that I advise the use of shot in a rifle, for I do not, but there are occasions when its use becomes absolutely necessary. The best method of extracting the bullet from the metallic cartridge shell is to place the cartridge upon a block of soft wood, on the surface of which is a "step" or elevation of about the thickness of the cartridge Rest the ball upon the "step," the edge of the "step" being as close to the edge of the cartridge shell as possible. Place over the shell of the cartridge a piece of board—press your foot upon it. The leverage thus obtained will force the ball from the shell in a moment. It is the most simple, easy, and least dangerous mode that I know of.

T. R.

Albany, N. Y.

Breakage of an Engine.

MESSRS. EDITORS:—An occurrence took place with my engine, recently, resulting in a rather singular accident. The occasion of the accident is involved in so much mystery that I have concluded to lay the subject before your practical readers and have the cause suggested to my mind fully discussed, and if possible, determined.

We use a horizontal condensing engine of 200 horse-power, having double vertical poppet valves. We are now using about 100 horse-power to drive a large new cotton mill in Paterson, N. J., known as the "Arkwright Manufacturing Company." We are running with 40 lbs. of steam having 27 to 28 inches vacuum. On the morning of the 4th of July the mill was started up as usual, everything working well for about an hour, when suddenly there came a general smash. The engineer shut off the steam and upon examining found the following breakages: the crosshead was split completely open through the key slot, and an arm about two feet long on the rocker shaft which drives the air pump, was also broken off near the hub.

I had the cylinder head and air chamber opened, expecting to find some solid substance within, as the cause of the accident, but there was not a bolt or any other substance inside of either out of place. On further examination, however, I found that the seat of the lower forward poppet valve had broken off and dropped down, thus giving the steam free access to the cylinder. The breaking of the arm that drove the piston in the air chamber could not have caused it, for it was a slight arm not doing much at best, and in breaking simply dropped out of the way. There being no other apparent cause for the splitting of the crosshead the question arises could this have occurred from the sudden admission of steam in a vacuum against the piston, say when at a half stroke with the full momentum of the fly wheel, etc., upon it?

I would mention here that the fracture of the crosshead showed the metal to have been perfectly sound, the piston being fitted in the usual way with a taper and shoulder, but I never considered it a good job, as the shoulder was very slight, and the abrasion showed that the taper was never well fitted, the key having been driven so as to draw the rod into the crosshead one-eighth of an inch over the shoulder, thus forming a powerful circular wedge in the crosshead though the key had not been driven for three months.

The only solution I can give is that the piston met with some violent resistance, the weakest point yielding to the momentum, the piston rod being driven, as it were, through the crosshead.

Query. Has steam, if suddenly admitted into a cylinder when the piston is at its greatest speed, the effect of checking up the motion so quickly as to cause the momentum of the engine to produce the above-described accident?

PRESIDENT OF COMPANY.

Paterson, N. J.

[As no foreign substance was found in the cylinder we can account for this singular breakage under no other hypothesis than that water in the cylinder produced the accident. Undoubtedly the piston did meet with "violent resistance," and that resistance, if not of some foreign body accidentally introduced in the cylinder, was that of water "priming" over from the boiler. We cannot see how steam can be so suddenly admitted to the cylinder of an engine as to cause such a general smash. Water might do it.—EDS.

Middlesex Mechanics' Association.

The third exhibition of this Association will be held in Lowell, Mass., on Tuesday, Sept. 10, 1867. Those who propose to become exhibitors should address Hocum Hosford, the superintendent, stating the space required, the steam power, if necessary, etc., and their articles for exhibition should be delivered by the 2d of September. Those intending to exhibit should address Mr. Hosford, who will furnish all the information needed either by letter or the very explicit circular of the Association.

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Improved Converting Motion.

Many attempts have been made to overcome the supposed imperfections of the crank by annihilating its "dead points;" or rather to produce a motion which should more readily convert a reciprocating into a rotary motion or *vice versa*. The inventor of the device shown in the engraving believes he has succeeded in producing a combination free from the objections of others devised for this purpose, and possessing some advantages peculiar to itself.

Its principal parts are a movable or sliding double-toothed rack in combination with a segmental pinion and rotating cam. The rack-frame, A, has secured to it at one end the piston rod of the cylinder, B, and slides in the ways, C. As the piston is sent forward and back of course the rack moves with it. Engaging with the rack, alternately at top and bottom, is the segment of a pinion, D, secured to the main shaft on which is the fly wheel, E. The outline of the pinion is denoted by the dotted lines. Secured to the pinion is a cam, F, whi ch as either end of the frame, A, approaches the center, or the main shaft, comes in contact with the curved pieces, G, at the extremities of the rack-frame.

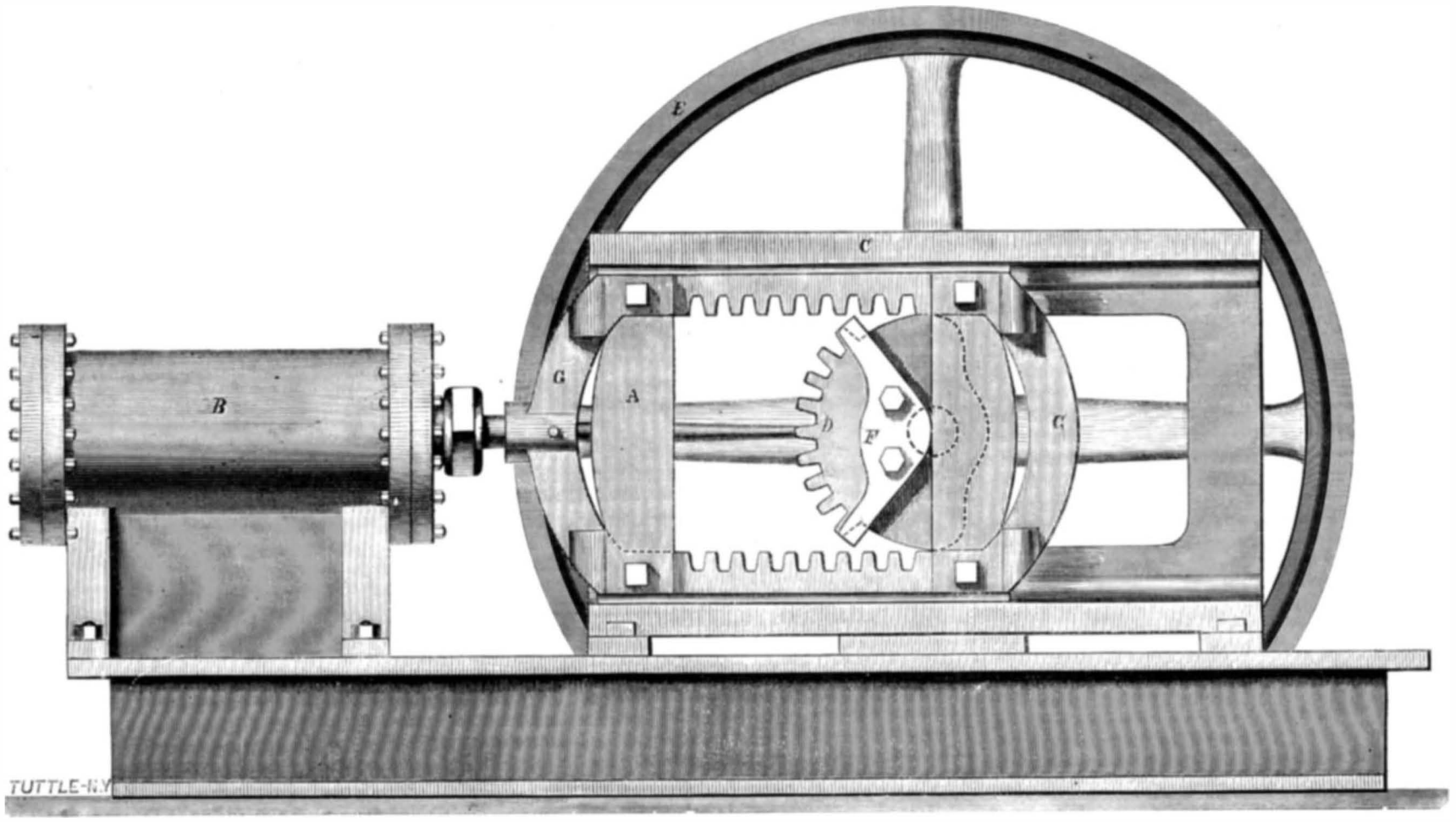
The operation of the engine is readily understood by reference to the foregoing explanation. The cylinder and steam chest is precisely like any ordinary engine, the other parts constituting the main differences. When the piston is moved by the force of steam in either direction, it carries with it the rack-frame, A, and the rack engaging with the segmental pinion, compels the shaft to make half a revolution. Part of this half revolution, however is made by the momentum of the balance wheel, as the pinion is toothed only about two-fifths of its circumference. As the rack reaches the end of the stroke the cam, F, rolls against the curved guides, G, and assists in throwing the rack in the other direction. We have seen a small engine work and found that its operation was very smooth, without jerking. How it will operate on a large engine remains yet to be seen. The object of the invention, and a most important one, is to dispense with the "dead points" of the crank and have a uniform leverage even to the end of the stroke. The inventor claims to have accomplished this end.

There is much disagreement among mechanics in relation tion to the loss of power in the crank. While some insist that this device for converting the reciprocating into the circular motion exerts its full force at only two points in an entire revolution, and that between these two points there is a constantly diminished force, others as strenuously assert that practically there is no actual loss of power. It must be admitted that theoretically the crank has a constantly varying power, and that its equable motion is due to the momentum of the fly wheel.

Mr. Page believes that a uniform leverage—that is a constant exertion of an equal amount of power at all points of the stroke—is better than the variable leverage of the crank, and that he has succeeded in developing a larger amount of power from a cylinder of a certain diameter with his improvement than is possible with the crank. He has experimented for years, and is satisfied he has greatly added to the power of the ordinary engine. For pumping purposes, especially, he claims a gain in actual performance of at least fifty per cent, and has demonstrated the fact to some of our best mechanics. The well known Woodward Steam Pump Manufacturing Company of New York have adopted Mr. Page's plan, and are about to apply it to their pumps. The President of the company in a note now before us says—'Thinking favorably of your patent engine, we have concluded to proceed as quickly as possible to apply the engine to our pumps."

We think the matter of sufficient interest to engage the attention of our engineers and mechanics, and suggest that they give the machine an examination. It is running near Mr. Page's office, No. 69 West street.

Patented in the United States, August 14, 1866. Applications pending for patents in England, France, and Belgium, through this office. For further information address John B. Page, 69 West street, New York City.



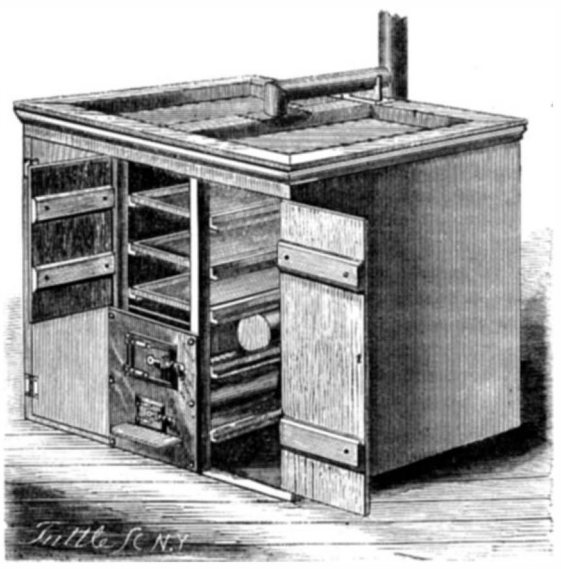
PAGE'S MOVEMENT FOR CONVERTING A RECIPROCATORY TO A ROTARY MOTION.

Rapidity of Thought in Dreaming.

A scientific writer says that a very remarkable circumstance and an important point of analogy, is to be found in the extreme rapidity with which the mental operations are performed, or rather with which the material changes on which the ideas depend, are excited in the brain. It would appear as if a whole series of acts that would really occupy a long lapse of time, pass ideally through the mind in one instant. We have in dreams no true perception of the lapse of time—a strange property of mind—for if such be also its property when entered into the eternal disembodied state, time will appear to us eternity.

LEAVITT'S FRUIT DRYER.

The consumption of fruits in a dried, dessicated, or preserved state has become an important element in our economics. Improvements in the preservation of fruits and vegetables from season to season have made the business one of considerable importance and compelled the general use of fruits beyond their proper season. Dried fruits, not being subject to decay so readily as those which are preserved in sirups or in hermetically sealed cans, have become a favorite article of commerce and use, and any means which will save part of the time and labor necessary to prepare them for the market and thus reduce their cost is a public benefit. Such is the object of the apparatus shown in the engraving.



It is a cupboard-shaped box, having in its lower part a furnace in which a fire is kindled, the smoke of which passes off to the chimney by a proper flue. On each side and over this furnace are shelves either of pans or slats, removable, on which the fruit to be dried is spread. Around the top are flues, the side flues being open on their lower sides and communicating throughout their whole length with the interior of the case. The end flues are closed except at their ends, where they communicate with the side flues and with a central flue at their middle. By this arrangement of the flues it will be evident that the remote upper corner of the dryer will be heated equally with the more central parts, as the excess of heat will be drawn thereto by the natural draft through the end flues which open into the dryer at those points and which are the only outlets. Thus, the excess of heat and the exhalations from the drying fruits escape through common outlets to the outside. Also, by thus causing the redundant heat and vapors to pass off around and over the top of the dryer, they add to the heating and drying capacity of the apparatus.

This device was patented May 14, 1867, by Charles Leavitt, Cleaveland, Ohio, who may be addressed for further facts in relation to the invention.

Self-Detaching Car Coupling.

A trial of a new car coupling was made at Elizabethport, N. J., July 10th, on the New Jersey Central Railroad. The correspondent of the *Journal of Commerce* reports:—The coupling pins are hinged to supporting rods, which are free to slide back and forth in suitable guides, and are held in position by springs. The coupling pins are provided with shoulders that catch underlips or stops in such a manner that the cars cannot become uncoupled as long as all the cars remain on the track, but will uncouple on a car that is so far off the track that it cannot be jumped back into its place again by the headway of the rest of the train. The committee stood near the track, on which an obstruction had been placed to strike the third car in the train of an engine and six cars. The train passed at the rate of twenty miles an hour; the third car was displaced by the obstruction, but jumped back again on the track, the coupling remaining firm in its place. The obstruction was then increased and the train approached at nearly thirty miles an hour. The third car met the obstruction, and was thrown out of the track too far to be jumped back, the front and rear coupling detached, the car rushed down the embankment, while the engine with the two leading cars, and the two cars that had been coupled behind the third, traveled safely along the track with hardly a perceptible decrease in their rate of speed. Several similar tests were made, resulting with the same unqualified success.

A Historic Gun.

In a private letter received at the Bureau of Ordnance dated Paris, June 14, 1867, appears the following scrap of information respecting a gun with a singular history:

One of the first items of interest that I found here was the old 3-inch bronze gun that we fired at the Washington Navy Yard in 1856 or 1857. The same gun was fired at the Washington Arsenal by Major Bell in 1855, and the same year it went to England and was fired at Shoeburyness by the Ordnance Select Committee. After that it went back to America, and in 1858 it was sold to the Mexican Liberal Government. It is now placed at the entrance to General LeBruff's office (Commander-in-Chief of Artillery), as captured by the French at Puebla, Mexico, by Maximilian, and presented by the Empress to the French government. It has our name engraved upon it. I thought this item might interest you as it was in this gun the first firing was made with our projectiles before government.

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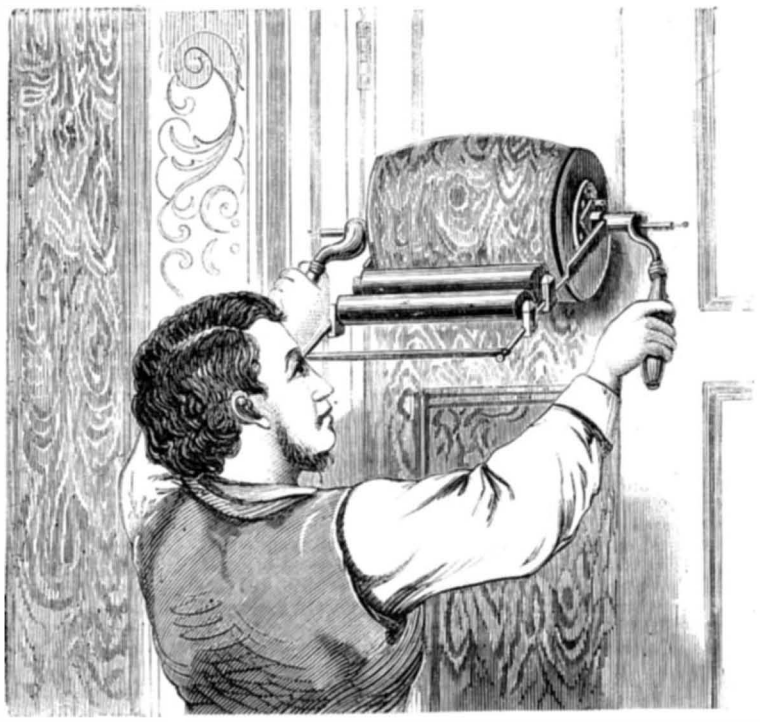
Improved Air Cylinder Graining Machine.

While every other trade has had the benefit of the inventor's skill, the painter has been left to plod along after the manner of his father of the last century, doing his work in the slowest and most expensive method. In the graining machine we have, however, something that while it will lessen the cost of work to the consumer, will facilitate the task of the workman and render the work more satisfactory to both. Finishing interiors in imitation of woods, grained in oil colors, is in good taste and in harmony with all the prevailing styles of building. It would also be more economical than any other style of finish, were it not for the tediousness and difficulty of getting even a tolerable resemblance by the present method of hand graining. To meet these wants, the Air Cylinder Graining Machine has been invented and after many years of extensive experiment has been successfully adapted to all the grainer's uses. The machine is simple in its operation, rapid in execution, and true to nature. It reverses the common mode of graining, which is to spread the color all over the work and then to rub out the lights, a plan which requires not only a skilled hand and a practiced eye to determine the pattern, but also a deal of labor to wipe it out clean, upon which latter the excellence of the work depends. The machine patterns are obtained directly from the fiber of the wood, so arranged that they take up the color, transfer it to the work and produce the dark shading of the wood, leaving the lights perfectly clean. The machine is constructed of a vulcanized rubber cylinder, in combination with an elastic belt in which the figure of wood is cast. It is supplied with a feeding apparatus, and is so arranged that different bands representing various woods may be employed at pleasure. The cylinder can also be regulated to different widths of panels.



ADAMS' AIR CYLINDER GRAINING MACHINE.

The ordinary graining colors are used. The machine will prove most useful and economical in many branches of manufacture. Owing to the elasticity of the air cylinder, convex, and even concave surfaces, when the depression is not too sharp, may be grained with as much facility as a flat surface. In many businesses where veneering is used solely for ornament and not for strength, the necessity for that tedious operation will disappear entirely, for as handsome exteriors can be produced by this machine on soft native woods, as are now obtained by the costly process of overlaying with expensive imported woods.

Indeed there is hardly a practical limit to the use of the machine, for its advantages are many and obvious. First, it does many times more work than can be done by hand. Second, it does not require skilled labor. Third, it produces work true to nature and uniformly true.

The machine is manufactured by Heath, Smith & Co., 282 Pearl street, New York, under the superintendence of the patentee, Mr. Adams. Messrs. H. S. & Co. will be happy to show parties interested samples of work done with the machine at their office.

The Decline of British Skill.

The Philadelphia *Ledger* says that, under this heading, the London *Review* contains an article, the drift of which is not consolatory to British interests nor flattering to British vanity. Timely warning of shortcomings may, however, incite to proper efforts at amendment and arrest incipient decline. When, says the writer, we set the example in 1851, of those international competitions for the palm of excellence in works of art and industry, of which we have now an example in Paris, the last thing we should have feared was that the day would come when England would be beaten in a department which she had deemed especially her own. The superiority of her manufactures over those of all other nations was taken for granted as a thing that could not be be disputed. But too great confidence has relaxed efforts at home, while all other nations have been pressing ownward in the race with an energy not shown by England. Earl Grenville, at a distribution of prizes at the London University, quoted the president of the Civil Engineers in proof of the superior progress in machinery which has been made by foreigners. "He declared, on good authority, that greater improvements have been made in the manufacture of iron in France, Belgium, Germany, and Austria, than in England, and he assumed, upon general report, the fact that, except in the manufacture of furniture, glass, and china, we have made little advance in most departments of industry."

These statements find confirmation in the observation and inquiries of Dr. Lyon Playfair, who had just returned from Paris, where he had been acting as juror in one of the classes of the exhibition. There were many eminent men, of different nationalities, serving in a similar capacity, whose acquaintance he had made at the previous exhibitions of 1852 and 1862, whose opinions he tried to elicit on the present subject. With very few exceptions, he adds, there was a singular coincidence of opinion among these persons, that England had shown little inventiveness and made but little progress in the peaceful arts of industry since 1862. Mechanical and civil engineers lamented the want of progress in their own industries. Chemical and even textile manufacturers uttered the same complaint. Deserved stress is laid on the fact, and it is one which ought to serve as a lesson for our imitation in the United States, viz: that France, Prussia, Austria, Belgium, and Switzerland possess good systems of industrial education for the masters and managers of factories and workshops, while England possesses none. It was stated to Dr. Playfair that technical education had given a great impulse to the industry of France. In this very exhibition, it was found on inquiry, that whenever anything excellent in French manufacture attracted attention, in the great majority of cases, the manager of the establishment producing it had been a pupil of the Central School of Arts and Manufactures.

On the other hand, it is alleged that England has been imperfectly represented in the Paris Exhibition. Who invented puddling? ask the champions of British inventiveness. Who invented grooved rolls? who first succeeded in substituting coal for charcoal? who suggested the live blast? who invented the process of casting steel? have not mills been constructed in England which turn out sound armor plates of such enormous dimensions as even in 1860 would have been considered impossible? While admitting all this, the fact of the ascertained inferiority of British manufactures which have been exhibited, is still evident.

LOWE'S SPIRAL SPRING PACKING.

To utilize all the steam admitted to the cylinder of the engine and to equalize the wear of the piston, and diminish, or at least, distribute the friction, are the objects sought by a number of different devices for the improvement of piston packing, That represented in the accompaning engravings has the merit of novelty and differs in one important respect from any other which has come under our observation.

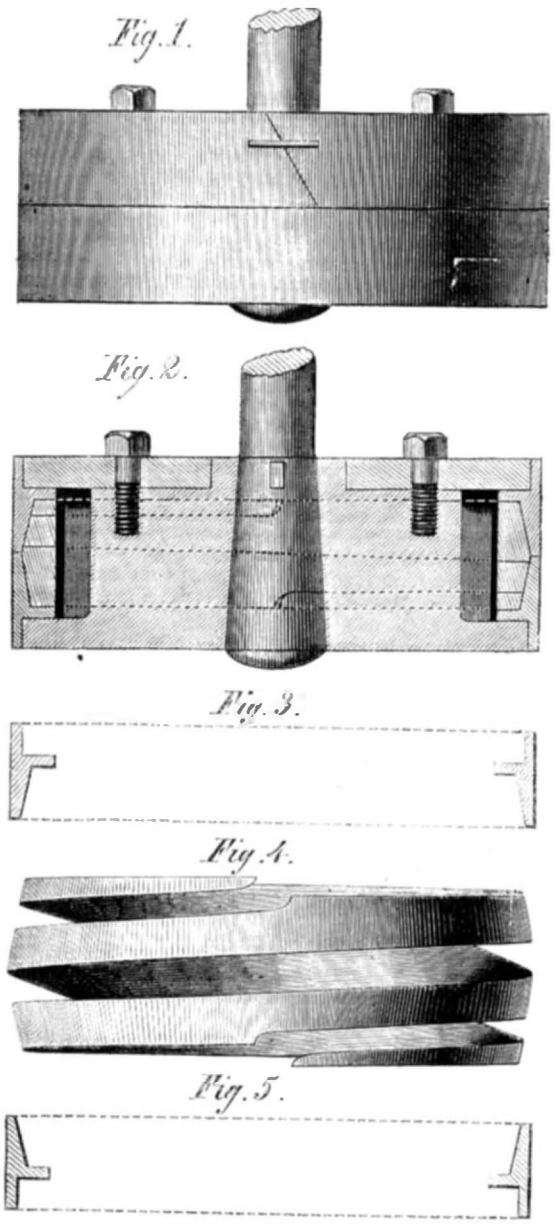


Fig. 1 is an outside view of the piston showing the two rings, which cover the edge surfaces of the piston head and follower. Fig. 2 is a sectional view of the piston, the dotted lines showing the spiral spring compressed between head, follower, and rings. Figs 3 and 5 are sections of the two rings, having inward projecting flanges, surfaced to the inside of the head and follower, and overlapping their edges, Fig. 4 is the spiral spring expanded laterally and vertically. This spring, it will be seen, is beveled on its face from the center to both edges, so that it may be readily introduced into its place. It bears on the flanges of the rings, keeping them in close contact with the head and follower, and its diameter is enlarged by the compression of the head and follower, so that it bears outwardly against the rings all around, keeping them out against the inner surface of the cylinder.

The inventor claims for this piston a greater contact surface, the whole thickness of the piston having an equal bearing, while a narrow packing tends to wear the cylinder unevenly; greater ease of taking apart, and more regular and efficient automatic action of the spring. It is evident that the extension of the rings over the edges of the head and follower is an advantage.

This device was patented Dec. 11, 1866, by Barker Lowe, Fall River, Mass., by whom all communications relative thereto will receive prompt attention.

SMITH'S IMPROVED EXTENSION LADDER.

This useful ladder will commend itself at a glance. The engravings show it in two positions, one closed and one extended. It can be used in all situations where the ordinary step ladder is used, and thus the advantage of being easily adapted either to slight elevations or to a greater hight, while it may be folded together as compactly as any now in use.

It is a double ladder, both the step bars and uprights, and each of these parts are attached to their mates by straps through which one slides, both being held securely by pins passing through one into the other, holes being made at convenient distances for this purpose. It may be either a low ladder of three steps or a high one of six, or of any degree of elevation between the two extremes. The cross bars between the upright and the steps may be adjusted instantly, to give greater or less spread to the base. For libraries, for papering or painting rooms, hanging pictures, picking fruit, and many other purposes this contrivance will be found to answer all the uses of several ordinary step ladders, and will occupy no more space when not in use than one of half its capabilities.

It was patented through the Scientific American Patent Agency June 25, 1867, by Henry T. Smith. For further particulars address Smith & Schenk 183 Fulton street, Brooklyn, N. Y.

THE ACCELERATING GUN.

On our first page are engravings illustrating the description, by the inventor, of Lyman's Accelerating Cannon, which seems to promise considerable changes in the form and operation of rifled guns. From this account it will be seen that its performances are much superior to the ordinary rifle, while the destructive strain upon the barrel is much less. It has been thoroughly tested and has received the unqualified commendations of many of our best ordnance officers, the principal objection urged being that its use would render all present means of defense by armor almost valueless. However this may be, it would seem that its powers must greatly exceed those of the single charge piece.

We hope our government will extend facilities to Mr. Lyman for the further testing of the practicability of the invention.

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Elastic Car Wheels.

Grigg's method of introducing wedges of wood between the rim and tire of locomotive driving wheels has been adapted by him to the wheels of passenger cars. The rims of the wheels have dovetailed recesses cast in them, the tires are then slipped on, and blocks of seasoned hard wood are driven into the recesses, firmly holding the tire and releasing its bearing from the iron. On locomotive driving wheels it prevents the stretching of the tires and the necessity of frequent "shimming" up, and is said to be much easier on the permanent way and the rolling stock than the ordinary method. This application of the improvement has been thoroughly tested with satisfactory results, and is believed to be equally beneficial when applied to car wheels.

A SILVER MEDAL was awarded at the Paris Exposition to J. R. Brown & Sharpe, of Providence, R. I. for a Revolving Head Screw Machine and a Universal Milling Machine, and another to Darling, Brown & Sharpe of the same place for Measures, Gages, etc.

Editorial Summary.

A MINIATURE VOLCANO.—Prof. Choutard, filling the chair of Natural Philosophy at Nancy, France, has devised the following experiment, showing the power of Ruhmkorff's induction coil. A quantity of the flowers of sulphur is mixed with a small proportion of iron filings, or, better still, with iron reduced by hydrogen, in which case it is in quite an impalpable state; zinc and copper filings may also be added in small quantities. The mixture, made as complete as possible, is placed on a pane of glass or a dry brick, so as to form a heap two or three centimeters high, and much longer than broad. The ends of the wires of a Ruhmkorff apparatus are inserted into the heap, so as to be two or three centimeters distant from each other. When ready, a current of electricity is sent through the coil, and instantly a violent explosion takes place. A sort of crater is formed, whence magnificent sheaves of fire are seen to issue, displaying colors like a boquet of fireworks. It is in reality a volcano on a very small scale, having its subterranean noises, as it were, and ejecting boiling lava.

BISMUTH.—A discovery has recently been made in South Australia of a lode of bismuth, and samples of the metal are now to be seen at the Melbourne Exchange, to which place they have been sent from the neighboring colony. This metal is very valuable if found in quantity, and it is stated that the lode discovered contains abundance of rich stuff, but being situated about 200 miles in the interior, some serious difficulties in the cost of carriage have been encountered. Trouble was also experienced in getting the metal smelted, but a quantity of it was sent to England in ingots some time ago, and it is expected the supply will be kept up.

THE City of Valparaiso is to be supplied with water through a canal to be cut from the Aconcagua River, flowing from the Andes Mountains. This canal, a portion of which has already been completed, is at the same time calculated to yield a revenue for supplying irrigation water to the lands throughout its course. With a view to effect these objects, a "Valparaiso Waterworks Company" is now being started in London, with a capital of $200,000, in shares of $20.

WALNUT SUGAR.—An Ohio editor has received a cake of sugar made from the sap of the black walnut tree. He pronounced it superior to maple sugar.

MUSTY GRAIN.—The musty smell which grain harvested in hot weather acquires, has been removed by Chalambel, by exposing it in the granaries to the influence of quicklime (which, however, should not be allowed to come in contact with it,) in the proportion of one part of lime to fifty of grain.

MILK QUOTATIONS.—At Berlin a milk market, with official quotations, has been established.

BENNINGTON, VT., boasts the possession of an artificial fountain which throws an inch jet to the hight of 154 feet. The celebrated fountain at Chatsworth, Eng., throws a jet ninety feet high.

ACTION OF CARBONIC ACID.—While workmen were engaged in re-opening and repairing the coal mines of Bow Buveur, at Jemeppe, they came upon a gallery communicating with the lower ladders, where they discovered seven bodies of the unfortunate workmen who, three mouths before, were imprisoned while making their way to the surface. The bodies were completely mummified, the shrivelled flesh adhering to the bones. This phenomenon is attributed to the abundant exhalations of carbonic acid gas collected in the gallery.

THE METRICAL SYSTEM.—The faculty of Yale College have decided on making a full knowledge of the metrical system one of the conditions for entering either its Academical or Scientific departments.

THE "UNLUCKY FRIDAY."—A very singular consequence of superstition is recorded in a recent Paris paper. It appears that the Paris Omnibus Company find their receipts sensibly diminished on Fridays, owing to the popular superstition of its being an unlucky day for traveling. The average difference between the numbers carried on other days and those on Fridays is no less than twenty-five thousand in favor of the lucky days.

AN AQUARIUM is about to be constructed at Berlin on the most extensive scale. Not less than $64,000 was subscribed during the first week after the idea was started. Dr. Alfred Brehm, a naturalist of note, has been placed at the head of the undertaking and is actively engaged in corresponding with every quarter of the globe for the acquisition of rare inhabitants for the new aquatic temple.

ASTRONOMICAL CLOCK.—A Methodist minister, of West Virginia, invented a clock attachment which calculates with scientific precision the rising and setting of the sun and moon, shows the changes of the moon, all eclipses, and other astronomical information relating to celestial phenomena. The calculations are made for one hundred years to come. The inventor has given to to his contrivance the above-mentioned name.

WATER SUPPLY.—New York is more wasteful of water than any other city in the world. In London, the quantity used is twenty gallons a day to each inhabitant, in Paris forty gallons, and in this City sixty.

LONDON REAL ESTATE.—As showing the wonderful increase in value of property in London, within three hundred years, it is stated that a plot of land containing about forty thousand feet, purchased in the year 1566, for 1s. 6d. per foot, is now valued at £20 per foot, or £800,000 for the whole, being an increase of £2,657 per year on an original outlay of £3,000.

HYDROPHOBIA.—A Detroit paper tells of an unfortunate resident of Pontiac, Mich., who, sixteen years ago, was bitten by a mad dog, and on a certain day each succeeding year, has been regularly seized with attacks of hydrophobia lasting but a short time. His last attack was on the 26th ult.

A MODEL Aerial Machine has been exhibited in France, which, by purely mechanical force, carries a mouse through the air. A sanguine and patriotic critic declares that France has solved the difficulty of aerial navigation, and that a machine proportionately large will raise an elephant much more easily than the model bears its tiny traveler.

SUGAR IN THE MUSCLES.—Dr. Ranke, of Munich, has by recent experiments confirmed the discovery made by Meissner, that a true, fermentable sugar exists in the muscle, which is increased by muscular action (tetanisation caused by strychnine or electricity), and further, that the liver has no effect in causing this increase, for the sugar is proved to arise in the muscle itself and not from muscular substance.

A VERY remunerative business has lately grown to pretty extensive protensive proportions in Melbourne in the exportation of leeches. The trade is principally carried on in connection with the operations of the Murray River Fishing Company, the fishermen there employed turning their attention at seasons unfavorable to the fishery to the collection of leeches. From 150,000 to 250,000 leeches are sometimes collected in one of the trips of the company's steamers. They are then packed and conveyed to Melbourne, where a large proportion of them are put up for transmission abroad, great numbers being sent to London and Paris, where it is stated they are preferred to leeches brought from any other place.

Exposition Notes.

THE immense spherical balloon nearly 70 feet in diameter, which makes hourly trips to the upper regions, is filled with hydrogen gas, made by decomposing steam by means of red-hot charcoal. By this process it is said the gas can be furnished at $3 75 per 1,000 cubic feet.

THE English exhibit one of their 12-inch guns, a muzzle loader, weighing 23 tuns, rifled with nine bands 2½ inches wide, and nine grooves 1½ inches wide, one-fifth of an inch deep, with increasing twist ending in one turn in thirty-seven feet. It has never been fired. There is also one of their 9-inch 12½-tun guns, with six bands and grooves, grooves 1½ inches wide, and one-fifth of an inch deep, increasing twist, one turn in twenty-four feet.

IN the number of articles contributed France naturally takes the lead with 11,645; England with 3,609, ranks second; Austria stands third with 3,072. Prussia exhibits 2,206; Spain, 2,071; Belgium, 1,447; Russia, 1,392; Switzerland, 986; America, 778; Sweden, 602; Netherlands, 504; China, 109.

AMONG the jewels exhibited is a very handsome beetle with diamond eyes and enamelled wings glittering with precious gems. On touching a spring he raises his wing sheath and discloses a watch possibly half an inch in diameter.

AN Austrian Engineer, Mr. Thomas Holt, exhibits drawings and models of a steam boiler, in which the tubes of ordinary boilers are replaced by a series of disks formed of plates, riveted or welded at the ends, through which the heated gases pass in the same manner as through the tubes. It is stated that by this means an immense increase of heating surface is obtained as compared with boilers of equal size constructed on the ordinary system directly over and near the fire; for example, a stationary boiler, 20 feet in length, on the ordinary system, would have 470 square feet heating surface; while one constructed with disks on Mr. Holt's plan would have 5,000 square feet. A more perfect combustion of the fuel and gases is obtained in this manner, evaporating about 40 per cent more water with the same amount of fuel than by those at present in use.

IN an annexe, Mr. F. Girard, of Paris, exhibits some improvements in the manufacture of tin plates. Ordinarily the iron plates, after being pickled and annealed, are dipped in melted grease, then plunged into a bath of melted tin which is covered with melted grease, the surface being imperfectly covered with tin. The plates are plunged into another bath of melted tin and left a sufficient time to make the alloy complete; they are then wiped on both sides with a hempen brush, and to remove the marks of the brush and to give a polish to the surface they are dipped again in a bath of melted tin, and finally dipped in a grease pot at a high temperature to remove any superfluous tin. By Mr. Girard's apparatus a uniform surface of tin is obtained by one dipping only, and the baths of melted grease and process of brushing are dispensed with altogether. The machine consists of a cast-iron bath divided into two compartments containing the melted metal, the temperature on one side being lower than that of the other, and in this compartment is placed a pair of revolving turned cast-iron rollers, 8 inches in diameter, and between these run the iron plates, coming out coated with tin at the rate of from 10 to 20 feet per minute. A little resin is thrown on the rollers as a flux.

IN the Wurtemberg Annexe is exhibited a machine for the manufacture of wood pulp for paper making. A clean white pulp suitable for paper making is produced at above half the cost of rags on this machine, and it is said that owing to the increased use of wood pulp, a rise in the price of rags has not taken place. In Germany there is hardly a newspaper printed, the paper of which does not contain more or less of wood pulp. Papers for printing purposes contain from 50 to 80 per cent of wood pulp; writing paper from 30 to 50 per cent; and some cardboard is exhibited made entirely from wood pulp. For printing purposes, paper containing a certain per cent of wood pulp is preferred to that made entirely of rags.

A NEAT little locomotive carriage by M. Larmanjet has been running about the Champ de Mars for some time, attracting, of course, a good deal of attention. Its cylinders and motion gear are beneath the boiler and boxed in. On the axle of the driving wheels are a pair of loose wheels of two or three inches smaller diameter, apparently intended to catch up the engine in case of its getting into soft ground, and there seems to be an arrangement for moving these wheels by powerful gearing if required. The engine is constantly in motion, runs at a good speed, and seems to be under very perfect control.

IN a magnificent display of timber exhibited by the Direction of the Austrian Imperial Forests there is an oak measuring 70 feet in length, 4 feet diameter at the base, and containing upward of 500 feet of timber, and a pine 3½ feet diameter and 130 feet long. For facility of transit it has, of course, been necessary to cut these trees into 14 feet or 15 feet lengths, but they have been carefully placed end to end, showing the tree as it grew, or rather as it fell.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

Sharp's rifle company of Hartford, manufactured for Government during the war about one-hundred thousand stand of arms adapted to the use of linen cartridges. The company are now making a new arm and are altering former manufactures so as to use their new metallic cartridges.

The petition before the Connecticut Legislature, of the Boston and New York Air line railroad for a draw-bridge across the Connecticut river at Middletown, has been defeated by a small majority. Permission was granted the company to throw across a suspension bridge at that point, but the carefully estimated expense is so great, that the project will be dropped for the present in the hope that next year's legislatnre will prove more accommodating.

A new railroad is to be built through Dutchess County, New York, to connect Fishkill on the Hudson, with the Harlem Road in Columbia County. The amount of subscription required from Dutchess County, $500,000, has been made up, and that portion of the road will immediately be put under contract.

Messrs. Simmons & Co. have just completed a fine organ for the Stone Church at Honolulu, being the first one ever sent to the Sandwich Islands. The native congregation sent fifteen hundred dollars in gold as part payment.

The Chief Engineer of the Newark and New York railroad has given notice that during next month a draw-bridge will be erected over the Passaic river, about half a mile above Newark bay, the two draws being ninety feet in length.

The Potosi mines in Missouri ship 10,000 pounds of lead weekly.

A letter envelope manufacturing firm in Buffalo, has received an order from the Western Union Telegraph Company for 3,000,000 envelopes, which is about three fifths of the amount required by the Company every year. The Merchant's Union Express Company are using envelopes at the rate of 6,000,000 annually.

Work on the western end of the Central Pacific Railroad is being energetically pushed on, and from present indications the road will be completed over the mountains in November. Over 16,000 workmen are engaged in grading, from Cisco to Trurpee summit, and the tunnel. The gross earnings for June were $122,000 in coin.

Carpets are now made in Philadelphia, from hemp and printed like calico, one side only being available.

The New Jersey Railroad have made provision for transporting 31,000 baskets of peaches per day over their road during the season.

The Marmora Iron mines in Canada, forty miles from Lake Ontario, have been purchased by Philadelphia capitalists. The purchase covers 23,000 acres, also the Coburg and Peterboro railway. Ore from this mine has yielded from sixty to seventy per cent of fine iron.

A firm in Providence R. I., are making an article of stiffened or filled gold watch cases, the center material being a nickel composition. Such a case is strong, not liable to indentation, and quite elastic.

The U. S. Bunting Co., of Lowell, are making bunting which excels the English in texture and color, and we need depend no longer on foreign manufacturers for the materials for the Star Spangled Banner.

The Essex Glue manufactory of South Danvers consume about 1,000,000 lbs. of hide cuttings, in the annual production of half a million pounds of glue, which is principally used throughout this and to some extent in foreign countries, in sizing woolen goods, paper etc.

The "Sampson scale company" has been organized in New York, with a capital of $1,000,000. The scale was invented by Elnathan Sampson, and is said to be equally sensitive to the weight of two ounces and four tuns.

Hides of tanned leather which have been buried during the war, are now being brought to light, and sent northward, for "reconstruction."

The June business of the Erie Railroad showed a loss of $100,000—due to the high price of corn and the low rate of freight.

This company gives employment to 8,000 men and with their families makes a support to some 40,000 persons. Last year its payment to employees was a half million dollars per month.

The citizens of Terre Haute, Indiana have offered the use of $40,000 for a number of years as an inducement for a new firm to locate a proposed rolling mill and nail factory, in that place.

The old-fashioned stage coaches have been again resorted to by travelers in some parts of England, owing to the high fares and unaccommodating policy of the railroads.

The Germania Sugar Company of Chatsworth, Ill., have 600 acres of beets growing.

The Hartford and New Haven Railroad has just been compelled by the Connecticut Courts to pay to Benjamin Bright $3,700 for the destruction of his barn at Thompsonville, some three years ago, by a spark from one of their engines. Heretofore this Company has always settled such claims by gift, not admitting a legal obligation, but from a sense of justice. This is the first case of the kind ever tried in Connecticut, and establishes an important precedent.

A company with $520,000 capital paid up, has been formed in Richmond, Va. for the purpose of purchasing land in that State for the erection of manufactories, and developing its mineral resources.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

APPARATUS FOR DRIVING PILES, PRESSING HAY, ETC.—Stephen Mahuin, Liberty, Ill.—This invention relates to an arrangement whereby a heavy weight may be raised with comparatively little power, to any desired hight, and then detached and allowed to descend by the force of gravity; and the improvement consists in the use of a revolving drum having a continuous groove on its periphery, journaled on an arm of the operating lever, which has its bearing in the stationary standard or drum, to which is attached one end of the rope or chain whose other end is attached to the weight and which passes over two pulleys on the top of the derrick or frame.

ADJUSTABLE SULKY PLOW AND TOBACCO HILL ATTACHMENT.—James L. Spencer, Wellville, Va.—The main features of this invention are the making of the axle adjustable in length; the method employed in lifting the plows over obstructions, whereby any one plow may be lifted independently of the others, or all may be lifted together; and the attachment for tobacco hilling.

MACHINE FOR BREAKING AND CLEANING HEMP, FLAX, ETC.—Henry Zellner, Columbia, Tenn.—In this invention the endless apron is independent of the feed rollers, and revolves with a much greater speed. A beater is so arranged and operated that its slats strike between the slats of the endless apron and thoroughly reduce the hemp or flax.

NUTMEG GRATER.—Richard H. Chinn, Washington, D. C.—The object of the invention is to enable the operator to use up the entire nutmeg without bringing his fingers into contact with the rough face of the greater and thereby wounding them.

COMBINED CLOVER THRASHER, HULLER, AND CLEANER.—Isaac N. Young, Swann, Ind.—The object of this invention is to construct a machine which shall thrash clover seed from the hay, separate the chaff from the seed, hull the seed, and clean the same, by the most simple, durable, and effective machinery possible.

COMBINED LAND ROLLER AND SEED SOWER.—Henry Zellner, Columbia, Tenn.—The object of this invention is the construction of a simpler, cheaper, and more effective arrangement of land roller and seed sower than any hitherto in use.

WASHING MACHINE.—Daniel Duncan and E. R. Ridgeley, Olney, Ill.—The concave which is partially submerged in the water of the suds box has a corrugated surface and holes through it; it is supported upon spring bearings, in such a manner that the vertical depression forces water in jets upon the clothes, while the traveling roller above presses upon them.

PRUNING SHEARS.—Samuel W. Jones, Bluffton, Ind.—In this invention the shears, fixed on the end of a staff, are operated by two levers connected by rods with each other and with the movable blade of the shears.

CUTTING AND GUMMING APPARATUS OF ENVELOPE MACHINES.—E. B. Olmstead, Washington, D. C.—This invention is designed to effect the cutting and gumming of single sheets of paper for envelopes in an envelope machine, by a single instrument which performs both operations at the same stroke.

PACKING APPARATUS FOR ENVELOPE MACHINES.—E. B. Olmstead, Washington, D. C.—This improved apparatus receives the envelopes from the carrier, folds the lappet, places the envelopes in packages of any desired number, fastens a band around such packages, and delivers them into a box.

FOLDING AND PRINTING BED OF ENVELOPE MACHINES.—E. B. Olmstead, Washington, D. C.—This invention consists in adjusting the bed upon which the envelope is folded upon springs which permit it to be depressed till the envelope comes in contact with the printing form, and also in regulating the motion of the bed for the economical cutting of the paper and the proper delivery of the envelopes to a carrier.

COMBINED CORN PLANTER, CORN HILLER, AND CULTIVATOR.—S. J. Taylor, Rome, N. Y.—The object of this invention is the combination of a corn planter, corn hiller, and cultivator in one machine, so that it may easily be adjusted for work in either capacity, and at the same time be neat, light, and convenient to handle.

SAFETY BRIDLE.—D. M. Donehoo, Beaver, Pa. Patented July 2, 1867.—The driving reins are made hollow and carry a safety rein which is connected to rings on the gag rein just in the rear of the gag runners. Force applied to the safety rein shortens up the gag rein and draws the bit ring toward the ring on the check strap by drawing the forward ends of the rear portion through rings in the rear end of the forward portion, and giving an increased power on the bit as the rear portion of the rein is doubled on itself and each forward portion is carried around the bit ring and check ring before being attached to the bit ring.

DETERGENT MATERIAL.—J. Mitchell and W. C. Laird.—The application and use as a detergent material of the ley obtained by boiling rags, esparto, grass, straw, or other similar materials employed in manufacture of paper pulp, whether such ley be used in the state it comes from the boilers, or be concentrated either by itself or compounded with the hereinbefore mentioned materials, substantially as described. Second, the application and use to and in the cleansing of wool and other fibrous substances, and for other purposes where coarse soap has hitherto been employed of the peculiar detergent material described.

PRESERVING ANIMAL AND VEGETABLE SUBSTANCES.—N. S. Shaler, dated November 26, 1866.—For these purposes animal and vegetable substances to be preserved are introduced into and retained in a chamber or enclosed space pervaded by an atmosphere of carbonic acid gas, such atmosphere being constantly maintained at a temperature as near as may be at the freezing point, though where the substances are not intended to be kept for a great length of time somewhat higher temperatures may be used.

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CONSTRUCTION AND ARRANGEMENT OF CHRONOMETERS, BAROMETERS, AND THERMOMETERS.—W. Weichert, Cardiff.—This invention relates to certain improvements in the construction and arrangement of chronometers, barometers, and thermometers, and consists, first, in causing the indication of marks of tenths of seconds, and in the beating of half seconds, and seconds: and second, in the combination with chronometers of a barometer and thermometer, forming one instrument. The face of the chronometer is furnished with an outer circular indicator beyond the periphery of the ordinary "seconds divisions;" this outer series is divided into six hundred parts, giving ten divisions to each second. The wheel work is also increased by extra pinions gearing into each other, in order to mark tenths, and beat half seconds and seconds. In the face of the chronometer below the center a space is cut in which a barometer dial is inserted, having the requisite indicators, and actuated by mercury as is well understood. The divisions on the scale may be made to any degree required, and the face of the barometer also contains a small thermometer divided into the scales of Reaumer Centigrade, and Fahrenheit. Now by these improved arrangements observations at sea may be taken with great accuracy, the time indicated by the chronometer being reduced to the tenth of a second, and, moreover, the indications of the thermometer and barometer are also shown, as it were, on one dial, thus forming a combination of all three movements in one.

BOOK-SEWING MACHINE.—Ferdinand Sims, Galveston, Texas.—This invention relates to a machine in which different sections of paper, each section containing one or more sheets, are sewed together previous to their being bound. With the aid of this machine the different sections of paper are sewed together, with the greatest ease and despatch, by one continuous thread, which is passed around needles, cords, or metal plates, forming loops around some of the said needles or cords, so that when all the sections are sewed together, the said needles, etc., are withdrawn, and cords or parchment bands are substituted in their place, when the book will be ready for binding.

MANUFACTURING CARMINE.—Gustav A. Siegle, Brooklyn, N. Y.—This invention relates to a new process of extracting carmine from cochineal. The invention consists in so treating the cochineal that it will yield coloring matter after the pure carmine has been extracted.

MACHINE FOR MAKING CENTERS FOR WATCH CASES.—Batiste Hilbert New York City.—This invention relates to an apparatus for casting, turning, and finishing the centers, rims, or rings of watch cases, to which the lids of ordinary watches are to be hinged.

OAR.—Abraham S. Jacobs, St. Louis, Mo.—This invention relates to such a construction of oars, that by their use the rowers will be enabled to sit with their faces toward the bow of the boat; the course of the boat can thereby be better regulated and easier controlled than by the ordinary oars.

KNIFE AND SCISSORS SHARPENER.—August Herthal, Bridgeport, Conn.—This invention relates to a device by which knives of any size as well as scythes, sickles, and other large, curved, or strait-cutting tools, and small knives and scissors, can be sharpened with great facility.

PEA RAKE.—Emery W. Rowley, Jr., Antwerp, N. Y.—This invention relates to a rake for raking peas, and consists in the attachment to an ordinary hand or other rake of a serrated or toothed cutter, the cutting edge of which projects below the head of the rake so as to cut the pea straw close to the ground when the rake is drawn over the same.

TREADLE AND CAM FOR LOOMS.—George S. Faulkner, Staffordville, Conn.—This invention relates to a device for operating the treadles on a loom, and consists in a novel construction of the cam, by which the required motion is imparted to the treadle; also in the arrangement of a block which is secured to the treadle, and which is worked by the flanges and sides of the cam.

HINGE FOR DOORS, GATES, ETC.—Alvah Wiswall, New York City.—This invention relates to the application of a spiral spring, lever, and friction roller, whereby the door, blind, or gate, to which the device is applied will be held in a closed or in an open state, and the use of fastenings for such purpose dispensed with, the device also serving as a hinge for the door, blind, or gate.

DROP PRESS.—L. H. Olmsted, Stamford, Conn.—This invention relates to a drop press for swaging, punching, and like purposes, and it consists of a novel automatic mechanism whereby the driving pulley of the machine may be operated continuously, and the rising and falling weight placed under the complete control of the operator.

PROCESS OF HOPPING BEER.—William S. Haight and Robert Green, Waterford, N. Y.—The object of this invention is to so treat the hops, and to so construct the vessel into which they are placed, that when the beer is added to the hops, the whole aroma of the hops will be extracted by the beer, and retained therein.

WEIGHING SCALES.—S. H. Franklin, Poland, N. Y.—This invention relates to an improvement in weighing scales of the steelyard class, and consists in a lever that is pivoted at one end, and at the other end is connected by a metal strap, with an eccentric forming part of a weighted pendulum or lever that carries a pointer to indicate the weight.

CLIP FOR CLOTHES LINES, ETC.—Julien S. Rowley, Chateaugay, N. Y.—This invention relates to an improved device for fastening clothes on lines to dry, and other similar purposes.

DOOR SPRING.—T. Van Kannel, Cincinnati, Ohio.—The object of this invention is to construct a door spring which will prevent the violent slamming of the door, and by which the door will be gently closed, power enough being obtained to overcome the pressure of the spring in the lock of the door upon the latch while the door is being closed.

CALL BELL.—W. H. Nichols, East Hampton, Conn.—This invention relates to a new construction of double-stroke call bells, whereby the same are made very simple and efficient, and whereby the cost for making the same is considerably reduced.

CHERRY STONER.—O. L. Robinson, Owassa, Mich.—This invention relates to an apparatus in which one horizontal receiving plate is employed, and is provided with concave depressions or countersinks, wherein the cherries are held. Each countersink is perforated with a hole large enough to allow the cherry stone to pass through. Above the receiving plate is arranged another plate of similar dimensions, also provided with countersinks, so that when it is placed upon the receiving plate the countersinks in both will form spherical chambers of sufficient dimensions that a cherry can lay in each chamber without being pressed. From the center of each countersink in the upper plate is suspended a punch, which, when the two plates are brought together, will pass through the cherry in the countersink of the receiving plate, and will force the stone through the hole in the countersink of the receiving plate, while the body of the cherry will remain in the chamber.

FARM GATE.—Isaac N. Young, Swann, Ind.—The object of this invention is to obtain a gate for use on farms which shall be simple in construction and not liable to get out of repair, which shall be easily opened and shut, and capable of being adjusted higher or lower as circumstances may require; which may be readily removed for repairs, and which shall be so adjustable as to permit the passing of the smaller animals about the farm, such as pigs, lambs, etc., while preventing the larger animals from escaping from one enclosure to another.

BREECH-LOADING FIRE-ARM.—D. C. Thrasher and B. F. Aikin, Freetown, Mass.—This invention relates to the class of guns known as breech-loaders, and to the manner in which access is had to the barrel for the introduction of the cartridge.

DROP PRESS.—John C. Rhodes, South Abington, Mass.—This invention relates to a drop press which is so arranged that the rebound of the drop will be caught and shut; the drop must be raised a certain hight before it can be dropped.

STOP MOTION FOR WARPING MACHINES.—L. V. Richmond, Brainerd, N. Y.—This invention relates to the application of a stop motion to warping machines of that class, in which the yarn is wound around a vertical polygonal reel.

PRESERVING ANIMAL AND VEGETABLE SUBSTANCES.—Edwin D. Brainard, Albany, N. Y.—The object of this invention is to deprive the atmosphere in a close chamber of its moisture at a low temperature by means of condensation upon a cold surface, and the collection and conveyance of the water of condensation therefrom outside of said close chambers without the admission of air.

CORN PLANTER.—B. Wieland, Orangeville, Ill.—This invention consists in attaching a corn planting apparatus to an ordinary plow by which seed corn is dropped in any required number in the furrow made by the plow, and covered by shovels attached to the handles to any required length.

INSTRUMENT FOR WATCHMAKERS' USE.—Charles E, Collins, San Francisco Cal.—This invention is designed to furnish a convenient instrument for the use of practical watch makers by the combination of a bench key, a case opener and measuring gages for watch crystals, main springs and pinions, all conveniently arranged together in one article.

STITCHING HORSE FOR SADDLERS.—O. A. Dean, Champaign, Ill.—This invention relates to an improvement in a stitching horse employed by saddlers and harness makers and consists in averaging the clamp so that it may be adjusted by raising and lowering the jaws to suit the stature or convenience of the workman, instead of being stationary as ordinarily constructed.

STEAM AND WATER JOINT.—William Young, Easton, Pa.—This invention relates to the manner in which steam and water pipes are joined together so as to make a tight joint.

GATE.—Burton Greenside, Fort Dodge, Iowa.—This invention has for its object to improve the construction of gates that swing both ways so as to make them more satisfactory and reliable in operation.

PLOW CLEANER.—C. P. Devereaux, North Newburg, Mich.—This invention has for its object to improve the construction of Huntington's plow cleaner patented January 15, 1867, so as to give it more power and make it more efficient in operation.

COTTON AND CORN PLANTER.—M. L. Thornton and R. W. Thornton, Lumpkin, Ga.—This invention has for its object to furnish an improved machine by means of which corn, cotton, or other seeds may be dropped in connection with guano or plaster.

PLOW.—Benjamin F. Avery, Louisville, Ky.—This invention has for its object to improve the construction of wrought-iron, steel, and cast-iron plows so as to make them simpler in construction and more efficient in use.

FARM GATE.—Sylvester Goewey, Dormansville, N. Y.—This invention has for its object to furnish an improved self-closing gate, simple in construction, not liable to get out of order, and which when opened or lowered will be entirely out of the way.

FLOOD OR WASTE GATE.—William L. Clark, Cambria, Wis.—This invention relates to a new and improved self-acting flood or waste gate for the preservation of mill dams, canals, and all water courses where there are occasional freshets or an excess of water.

COTTON-SEED PLANTER.—Luther F. Wilcox and William G. Caldwell, Three Rivers, Mich.—This invention relates to a new and improved machine for planting cotton seed, and it consists of an improved seed-distributing device, arrangement of gearing for operating the same, and an improved means for preventing the choking or clogging of the hoppers, all being constructed and arranged in such a manner that cotton seed may be planted at suitable and equal distances apart and in one or more rows as may be required.

PASTRY ROLLER.—Albert L. Taylor, Springfield, Vt.—This invention relates to a new and improved device for rolling pastry, and is designed to supersede the ordinary single roller now employed for that purpose. The single roller requires to be passed over the paste or dough several times and in different directions in order to spread it evenly or form a sheet of even thickness throughout, whereas this improved device requires to be passed over the paste only once or twice in ordar to perform the work and it may be operated with far greater facility than the ordihary single roller.

WASHING MACHINE.—J. G. Bailey, Hillsdale, Mich.—This invention has for its object to furnish an improved machine by means of which the washing may be easily quickly, and thoroughly done.

PROPELLING VESSELS.—William A. Cobb, Orange, Mass.—This invention has for its object to furnish an improved propeller by means of which vessels may be propelled with greater speed and with much less bulk and weight of machinery than is possible with the devices now in use.

LAND ROLLER AND CORN MARKER.—A. Mains, Olena, Ill.—This invention has for its object to furnish an improved instrument by means of which the land may be rolled and marked for planting at the same time.

WAGON BOXES.—D. H. Peterson, Terre Haute, Ill.—This invention has for its object to improve the construction of wagon boxes, so that they may be put together and taken apart readily and quickly, and which will hold the parts of the box securely in place.

WASHING MACHINE.—William Goodman, Troy, Mich.—This invention has for its object to furnish an improved machine by the use of which the clothes may be easily, quickly and thoroughly washed and from which the water may be conveniently poured so that the clothes may be washed through several waters if desired without its being necessary to handle them.

WASHING MACHINE.—William L. Camp, Holden, Mass.—This invention has for its object to furnish an improved machine by means of which the clothes may be washed easier, quicker and more thoroughly than they could be with other machines.

GRAIN SEPARATOR.—A. W. Lockhart, Sacramento, Cal.—This invention has for its object to remedy the faulty construction of other separators and to furnish one in which the blast shall be delivered more evenly throughout the shoe and with better effect.

PISTON PACKING.—George Robinson, Detroit, Mich.—This invention relates to a method of packing the pistons of steam engines and it consists in employing three packing rings for that purpose, which are forced outward against the cylinder by the pressure of the steam.

APPARATUS FOR DISTILLING AND REFINING.—C.G. Howell, Corning, N. Y.—This invention relates to the manner in which the heat is applied in the distillation of petroleum and other liquids.

VENT FOR CASKS, BARRELS, ETC.—Oramel N. Wood, Windsor, Vt.—This invention relates to a vent designed to be inserted in casks or barrels containing liquids, to admit, when the liquid is to be drawn from a cask or barrel, of atmospheric air entering the latter, in order that the liquid may flow freely through the faucet. The object of the invention is to obtain a simple, cheap, and efficient vent which may be very readily applied and operated with the greatest facility.

FRUIT BOX.—Wm. R. Wilcox, St. Joseph, Mich.—This invention relates to that class of fruit boxes which are constructed of thin strips or veneers of wood the sides of the box being composed of a single strip. It consists in a novel manner of inserting and securing the bottom of the box in the body thereof, and in an improved mode of securing the lapped end to one of the sides of the box.

MOP HEAD.—H. H. Mason and Joseph Messinger, Springfield, Vt.—This invention relates to that class of mop heads which have their movable jaws operated by a screw and nut, and consists in a novel way of attaching or connecting the ends of the wire or rod composing said jaw to the nut whereby a very cheap and durable connection of said parts is obtained.

COMBINED CORN PLANTER, HARROW, AND CULTIVATOR.—David D. Stelle, New Brunswick, N. J.—This invention consists in constructing a corn planter arranged with cut-offs, so that any required quantity of corn may be dropped at given distances, which is regulated by a cam on the axle. This machine has a revolving harrow, the teeth of which pass between a set of stationary teeth, and thus crush the clods which are too large to pass between them. A set of revolving hoes can also be used in place of the harrow. The teeth of the harrow and the hoes are set in spiral form.

COMBINED SCRUBBER AND MOP HOLDER.—J. J. Harlan, Cincinnati, Ohio.—This invention relates to an improved combined scrubber and mop holder in which the mop and scrubber can be used together. The mop cloth serves as a lubricator to keep the scrubber moist.

PITCHER.—William Bellamy, Newark, N. J.—This invention relates to certain new and useful improvements in that class of pitchers which are constructed with double walls in order to keep the contents of the pitcher cool, and which are commonly termed "ice pitchers." The invention consists, 1st, in constructing the pitcher with two lids, having their hinges at opposite points or sides, as hereinafter fully shown and described, whereby the top of the pitcher is rendered equally as capable of resisting atmospheric influences as the sides and bottom, and at the same time the lids are rendered capable of being fully opened so that the pitcher may be filled with ice and liquids, with equally as great facility as the ordinary single lid pitchers. The invention consists, 2d, in inserting a tube between the two walls of the pitcher, the lower part of the tube communicating with the lower part of the interior of the pitcher, and the upper end of said tube communicating with the nozzle or spout.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at 50 cents a line, under the head of "Business and Personal."

J. S. M., of Me.—In heating an evaporating pan by steam, the steam being generated in an independent boiler, and brought into a steam jacket around the pan, the steam should be confined. The heating power increases with the pressure, and in a heating apparatus, only the small quantity of steam required to keep up the circulation should be allowed to escape. . . Pressure gages indicate the pressure above the atmosphere. The total internal pressure in the boiler is therefore 15 lbs more than that indicated by the dial of the gage.

J. B. W., of Ky.—An alloy composed of 90 silver and 10 platinum will probably answer your purpose. It is not tarnished by sulphur, and is of the same color as silver but harder. On boiling in sulphuric acid a part of the silver is dissolved from the surface and you have the peculiar effect sometimes, but improperly, called oxydation. The proportion of platinum may be varied within pretty wide limits. . . . Aluminium is not affected by dilute and cold sulphuric acid, but is very readily soluble in hydrochloric acid of any strength. It has as yet no established price and there are in this city only a few ounces. In quantities of ten pounds and upwards it ought to be furnished for about $4 per lb. In small quantities it will cost from two to five dollars per oz. A large demand would soon bring down the price.

R. C. C., of Mich.—For silvering lenses we recommend to you the processes in which silver is precipitated on the glass from a solution of nitrate of silver. The process known in Cimeg's is one of the best.

H. M. C., of Ala.—We are not aware that the laws of your state secure any peculiar protection or advantage to the discoverer of a mineral deposit. If the substance you have found is different in properties from any before known you may be secured by a patent.

R. H.. of N. Y.—Pyrites is now largely used in the United States in the manufacture of sulphuric acid. The mineral is obtained in Canada, New York and other States. Copper pyrites is mined in Vermont. Kryolite is used in the manufacture of caustic soda in Western Pennsylvania.

P. F. M., of N. Y.—No satisfactory explanation of the light emitted by the lightning bug has yet been given. Probably it is a cause of muscular energy transformed into light. The light is of a phosphorescent character.

W. W. G., of N. Y.—You will find petroleum oil very useful in cleaning your rusty engine; it is very energetic in loosening iron rust.

W. E. B., of Pa.—"To indicate the time between 12 M. and 1 P. M. which abbreviation should we use." P. M. The abbreviation M is properly applied only to the instant of time when the sun is on the meridian.

A. J. S., of Mass.—Stucco ornaments are generally cast in molds of stucco, the molds being well oiled during use. Pitch, wax, and wood are also suitable materials and are sometimes used.

J. B. W., of Col., writes that he is quite *au fait* concerning the causes and cures of cholera; that he has made great discoveries, therein, etc.

G. B., of Ill.—Your arrangement of the magnets and armatures of a magneto-electric machine is ingenious, and probably novel The "magnet cylinder" armature as in Wilde's machine has, however peculiar advantages of compactness and simplicity, considerations of great importance in view of the rapid motion.

H. M. S., of O.—The vulcanizing process is generally understood by dentists, and some of your neighbors of that profession may give you the information you desire.

F. R., of N. Y.—Paraffin is a solid substance resembling wax and is obtained from coal oil and petrolenm. * * The effect of sodium amalgam is to increase the affinity of mercury for other metals. * * * The essential oil of flowers is commonly extracted by exposing the flowers to the absorbing action of pure lard.

S. M. R., of Pa.—The copper amalgam is not used for filling teeth. The objections to it are that it is poisonous, and becomes loose in the cavity either from contraction, or from solution of its surface.

C. S. C., of N. Y.—It is probable that the masses of all the planets and the sun are increasing from the fall of interplanetary matter. The peculiar and precise effect of the increase is a very difficult mathematical problem, which we do not care at present to discuss.

P. N., of Pa.—A solution of bichloride of platinum is used for the bronzing of gas fixtures and other brass work. For a brilliant red lacker, try an aniline red dissolved in colorless spirit varnish.

G. E. W., of N. Y.—The difficulty of soldering aluminum and aluminum bronze is well known. It is said that a solder containing a considerable proportion of zinc is successful.

T. M. S., of R. I.—Ure says that cotton fiber can be distinguished from linen by immersing it for a minute in strong sulphuric acid, It is then withdrawn and washed with water containing a little alkali. when it will dissolve into a gummy mass. Linen thus treated will retain its fibrous texture. The microscopic test is however preferable.

A correspondent whose address we have lost is referred to "Weisbach's Mechanics" for information on the raising or back flow of water caused by dams.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Street Pavement Inquirers—I can reply only to those wishing to invest with me; all others see page 6, No. 1, this volume. A. Packham, Carrollton, Ky.

Makers of light open car wheels for hand cars, please communicate with Holske Machine Company, 528 Water street, New York City.

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

1,571.—COMBINED SEEDER, CULTIVATOR, AND ROLLER.—James P. Long and Peter Low, Cherry Valley, N. Y. May 28, 1867.

1,657.—SPRING HOOK.—Samuel Lagwitz, New Jersey. June 5, 1867.

1,663.—ARTIFICIAL LIMBS.—Amasa A. Marks, New York City. June 6, 1867.

1,677.—SEWING MACHINE.—Nathan A. Baldwin, Milford, Ct. June 7, 1867.

1,679.—BRUSH, AND APPARATUS FOR MANUFACTURING THE SAME.—Barnard Lavery, New York City. June 7, 1867.

1,721.—STEP COVER AND WHEEL FENDER FOR CARRIAGES, ETC.—John W. Gosling, Cincinnati, Ohio. June 12, 1867.

1,723.—PONTOON BRIDGE, ALSO LIFE RAFT AND LIGHTER.—John Wright New York City. June 12, 1867.

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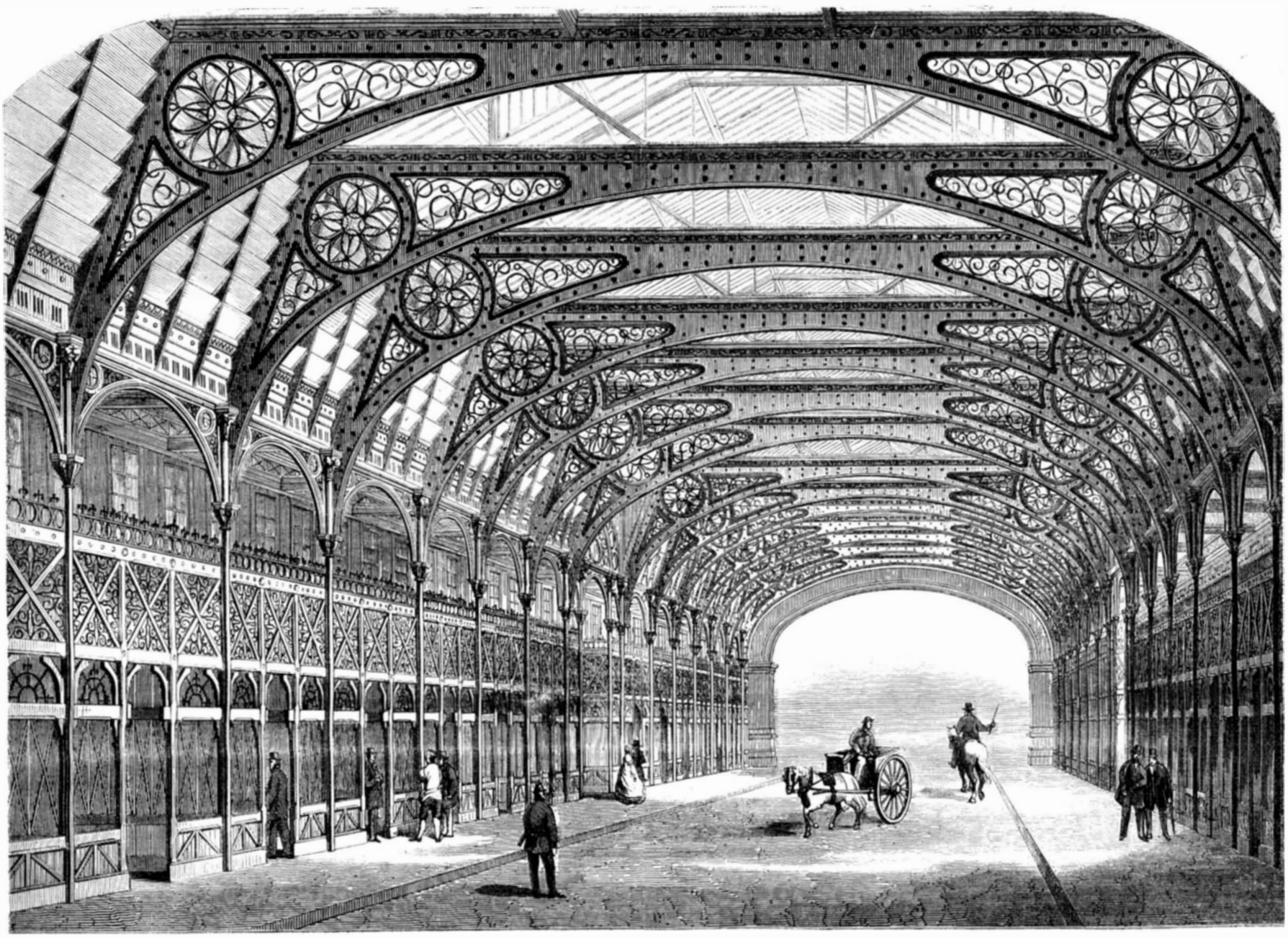
New Market for London.

We copy from the London *Builder* a fine engraving of the interior of the new market just built in Smithfield for the supply of a portion of London. As will be seen from the illustration, which shows the central roadway through the building, the judicious combination of oak and iron produces a very fine effect.

The market is built over the joint depot of the Metropolitan and Great Western Railways, which are here subterranean. The roadway seen in the engraving is on a level with the street, and is 50 feet wide in the clear. The building is 631 feet long by 246 feet wide, inclosing a superficial area of 3½ acres. The shops front on passages running at right angles to the main roadway. Each has a room above, for counting-room or offices, and between the ceiling of these rooms and the roof of the building is ample room for ventilation. Each shop is 30 by 15 feet. Stairs and dumb-waiters lead to the railway trains below the floor of the market. The building is lighted during the day by a louvre roof, and at night by gas in pendant glass globes in the central avenue, and scroll brackets in the passages.

It is to be hoped that such examples as this may not be lost upon the authorities of the commercial metropolis of this country. Without an exception, the New York markets are a disgrace to the city and discreditable to the enterprise of our people. It is surprising that such dirty, inconvenient, and disgraceful shams as our markets, are not supplanted by structures which would be creditable to American enterprise. Buildings might be erected in place of the tumble-down shanties now dignified with the name of markets, which would be not only objects of pride as architectural structures, but be made sources of revenue. Few public improvements are more needed in New York City than market-houses, which would not be as are the present, literally a stench in the nostrils of the people.



THE SMITHFIELD (LONDON) NEW MARKET HOUSE.

MISAPPLICATION OF TERMS---A SO-CALLED EXPLOSION.

All burstings of steam boilers are not explosions. An explosion is when a sudden generation of gas, whether of steam or of some other element, rends the material which before held it in place and under control, and tears it suddenly into pieces, or the reservoir, or boiler, is lifted from its place, and either hurled to work destruction outside the locality in which it was situated, or lifted from its seat, ruptured and torn, to scald and burn those in its immediate vicinity. These are properly explosions; but boilers are burst simply by the over pressure of steam caused by lowness of water or imperfections, as weakness of material, etc.

Such as the last we denominate a recent accident to a boiler which was one of a nest of three boilers each 60 feet long by 32 inches diameter and of ¼-inch iron. The explosion occurred on the 12th of July at the sugar refinery of Bertrand & Co., Water street, Brooklyn, L. I. Mr. F. W. Bacon, a well-known engineer, furnishes us with the following account of the results of his examination:—

The boilers were plain cylinders with a steam drum running across above, near the head, thus connecting them. They were set on an inclination of about 25°. Furnaces 8 feet by 3 feet each, under the higher end the heat passing on the under side part way down and then enveloping the whole boiler. The lower gage cock about 3 inches from bottom; two others 3 inches apart above. The right-hand outside boiler had a whole sheet torn almost completely out just in front of the bridge wall. It seemed to have swelled down until it gave way and then was torn off nearly around in the lines of rivets. Neither the boiler nor its mates were in the least moved from their position, The brickwork, of course, was pretty thoroughly demolished around the furnaces, and the shed over them, showing, however, no marks of an explosion, simply the effects due to the expansion of the steam and liberated hot water. There were two safety valves, apparently in good order and large enough, and said to be loaded at 50 lbs. per inch. It is said there was 45 to 47 lbs. pressure at the time of the rupture. It is claimed also by the engineer in charge that there was water sufficient. There were no glass water gages.

The rupture took place in the third sheet from the end. The second sheet was directly under the steam drum and a stay bolt went from the top of the drum and was made fast to the sheet. On either side of this bolt the sheet had settled down some two inches. The sheet in the middle boiler also had settled in the same way, and the next sheet beyond, corresponding with those that gave out, was also swelled as much. The sheets in the places mentioned were quite smooth and black, no red oxide, scale, or ashes that covered the other parts of the boilers visible. The rivet heads also had the same appearance. The fractures directly over the fire were black; those on the top were bright. The iron was completely disintegrated. On breaking it a few bright crystals could be seen; the remainder was black.

The swelling of the plates, the color of the exterior, the disintegration of the iron, all show most conclusively that when the sheets swelled down they were red hot; consequently could not have been covered with water. The mode of setting the boilers renders it almost impossible to keep the water at a reliable point in consequence of the great inclination leaving but a very small surface of water to evaporate from; to this add the rushing up of the steam made in the lower part of the boiler when it is entirely full of water and with hard firing the water must be very unsteady and uncertain.

A STROKE OF LIGHTNING at mid-day, from a perfectly clear sky, prostrated three inhabitants of South Killingly, Ct., on the 29th ult. It was accompanied by a heavy clap of thunder, and in half an hour afterwards there were a few drops of rain from a cloud that sprang up in the north-west.

Durability and Tenacity of Steel Rails.

The London *Railway News* says that at the Chalk Farm Station of the London and North Western Railway a Bessemer steel rail is now to be seen still in use, and in good order, which has outlasted twenty-five iron rails successively placed next to it on the same line. Judging by this example, the steel rails are at least twenty-five times as durable as iron ones. Steel rails are very tough, as some experiments made within the last few days at the works of Messrs. John Brown & Co., and Messrs. Cammell & Co., of Sheffield conclusively illustrate. These experiments were made chiefly for the satisfaction of the Hon. W. J. McAlpine, formerly engineer of the State of New York, and much connected with railways in America, who contemplates the more extended introduction of steel rails into that country. The result was to show the great toughness and powers of endurance of the steel rails. In one of the experiments a ram of a tun weight was suffered to fall upon a rail of 68 lbs. to the yard, supported on iron blocks 3 feet apart in the clear, from a hight of 20 feet, and the only effect was to bend the rail. The rail was then turned upside down and the blow was repeated, when the rail was bent straight, but without any cracking being visible. Finally the rail was exposed to the test of a tun ram falling through 30 feet, when the rail was very much bent and twisted, but not a crack was visible. By the mode of manufacture now adopted, perfect uniformity in the composition of every rail is insured.

Women Watchmakers.

Twenty thousand Swiss women earn a comfortable living by watch making. They make the movements, and even mostly put them together. A few women are finishers. The *English Woman's Review* says:—"Geneva has refused to employ women, and totally lost the watch trade. None of the so-called Geneva watches are made there, but in Neufchatel, where women have always been employed."

A traveler says:—"We see women at the head of some of the heaviest manufactories of Switzerland and France, in the watch and jewelry line." In England, women are employed in one London establishment, and in several principal towns. Five hundred women are employed at Christ Church in making interior chains for chronometers.

American watches are made by machinery, while those imported are made by hand. The Waltham Watch Company employs two hundred artisans, of whom seventy-five are women. Some Swiss women in Camden, N. J., make inside work for watches. In Boston, women cut the teeth of chronometer and watch wheels, earning from $4 to $6 a week. Delicacy of touch, practice, and great care are needed. A Waltham overseer says men earn double what women do, for they do more difficult work, are more thoughtful and contriving, more self-reliant and stronger; and besides it is the custom to pay women less for the same work.

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Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN. S. H. WALES. A. E. BEACH.

☞ "The American News Company," Agents, 121 Nassau street, New York

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VOL. XVII., No. 5....[NEW SERIES.]....*Twenty-first Year.*

NEW YORK, SATURDAY, AUGUST 3, 1867.

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THE LINEN MANUFACTURE.

Probably the first textile spun and woven into cloth was wool, as it would evidently suggest itself in a raw state as well adapted to this purpose; but the manufacture of linen, dates from the earliest history; at least the earliest written records speak of it as well known. It was old in the time of Herodotus and the oldest Egyptian mummies are swathed in it. Among that singularly superstitious people it seems to have borne a sacred character, as their priests were forbidden to enter the temples clothed in any other than linen garments and their dead were always shrouded in it.

On account probably of the superior ease with which cotton can be prepared for the loom, the manufacture of linen, in this country, does not seem to have attained the proportions which its value and that of the plant from which it is derived entitles it to. The extensive application of machinery to its manufacture is of quite a recent date, and even now much of the Irish linen is manufactured, from the time it is pulled to its transformation into cloth, by hand.

Massachusetts seems to have led the way in the manufacture of linen. In 1632 it seems that the people of this colony had generally turned their attention to cattle raising, importing from England most of their clothing, and all of the finer sort. In 1640 the Assembly took the matter in hand and decreed that:

The Court taking into serious Consideration the absolute Necessity for the Raising of the Manufacture of Linnen cloths, doth declare that it is the Intent of this Court that there shall be an order settled about it, and therefore doth require the Magistrates and Deputies of the several Towns to acquaint the townsmen therewith, and to make Enquiry what seed is in every Town, what men and women are skillful in the braking, spinning, and weaving, what means for the providing of Wheels; and to consider with those skillful in that Manufacture, and what course may be taken for teaching the boys and girls in all Towns the spinning of the yarn, and to return to the next Court their several and joint advice about this Thing. The like consideration to be had for the spinning and weaving of Cotton Wool.

This description of cloth to which this order applies appears to have been a mixture of linen and cotton or linen and wool. In the same year an order of the Court offered a "bounty of three-pence on every shilling's-worth of linen, woollen, and cotton cloth, according to its valewation, for the incuragment of the Manifocture."

In 1662 the Assembly of Virginia enacted laws for the promotion of industry in the making of cloth and raising the materials. Flax seed was imported from England and distributed to each country and bounties offered for raising it. Two pounds of tobacco were offered for every pound of flax or hemp prepared for the spindle, three pounds for every yard of linen cloth a yard wide, and five pounds for every yard of woolen cloth. Every tithable person was required, under a penalty of fifty pounds of tobacco, (then the great staple of the colony) to produce yearly two pounds of dressed flax or hemp.

The industrious Dutch matrons and maids of New Netherland—New York—as early as 1670, are described by Denton as great manufacturers of linen. He says: "Every one make their own linen and a great part of their woolen cloth for their ordinary weaving." In New Jersey in 1677, or soon after, Quakers from Yorkshire and London made linen cloth, and in Pennsylvania in 1693 and Delaware at about the same time one of the principal employments of their women was the spinning and weaving of linen. Scotch-Irish carried on the business extensively in New Hampshire in 1719. The first linen factory was established in "Long-Acre"—Tremont street—Boston in 1737.

In Canada the culture of the flax has received more earnest attention than with us. There are at least three quite extensive manufactories of linen in that province, each employing over two hundred hands. There are also three linseed oil mills. It is said that the Canadian farmers realize almost as much from the seed, beside the value of the fiber, as from wheat. We cannot give the present condition of the manufacture in this country, but from the census of 1860 we find that it is confined mainly to the states of Massachusetts and New York, in which there are ten establishments with an aggregate capital of $639,795 and employing 528 hands. Probably this account would receive large additions if the present condition of the manufacture could be stated. The importance of this branch of industry may be inferred from the fact that in 1862 we imported linen to the value of $2,894,314 and other manufactures of flax to the value of $3,173,672.

THE PATENT OFFICE DELAYS.

For the last year and a half we have earnestly labored with the Commissioner of Patents to induce him to bring up the work of the Patent Office and put an end to the outrageous delays in the examination of the applications, which are so oppressive upon our inventors. But our labors have so far been in vain. The Commissioner has been profuse in promises, but almost the only thing he has really done to increase the force of the office is to fill one of the vacant examinerships by the appointment thereto of a mere politician, who has no knowledge or appreciation of the duties of the position. This appointee received and holds the office as a sinecure, and when we last heard from him, had not made a dozen examinations, although he had then been in office some three months. This is a fair sample of the manner in which the present Commissioner is helping along the affairs of the Patent Office.

We need not say that, when applications are so rapidly on the increase, and when so many thousands of poor inventors are waiting their turn for examination, it behooves the chief of the establishment to see to it that none but rapid and competent persons are appointed to the important positions of examiners. The obvious teaching of common sense would be to select from the corps of assistant examiners those who are most competent, most experienced, and quickest, and promptly advance them to the grade of full examiners. If the vacant posts cannot be filled within the Patent Office, then search outside for the right sort of individuals, and enjoin upon them the importance of expediting the work in every possible way. But it is too much to expect that an official who has no faculty for management, will adopt any such plain and simple method of relief.

In the meantime, is there nothing that inventors and solicitors can do by concert of action, to bring about a change at the Patent Office, and secure the prompt examination and decision of applications? We think there is. Let every applicant for a patent, and every solicitor who is suffering from delay, sit down and write letters of urgent complaint, one addressed to the President of the United States, another to the Secretary of the Interior, and a third to the member of Congress from the writer's district. Let the writer state the length of time that his application has been pending, and give some idea of the importance to him and his associates of a speedy examination by the Patent Office, and ask that something be immediately done for his relief. If each inventor and solicitor will take the trouble to write as we suggest, there will be poured into the ears of the President, Secretary and Congress an overwhelming stream of complaints which will impress upon them the importance and necessity of vigorous action.

All letters for the above officers will go through the post free of charge.

Inventors and solicitors, sit down and write!

THE UNION PACIFIC RAILROAD.

The building of this road and the probable results of its completion make the enterprise one of the most important of modern times. Its purpose is to connect the two portions of an empire separated by the breadth of a continent, and to plant settlements in what is now but a wilderness occupied by roving bands of savages. Other railway projects may be more noteworthy for their triumphs over greater engineering difficulties, but none can exceed this in grandeur of conception and magnitude of results. Already villages are springing up along the route as the work progresses and the receipts even now exceed, several fold, the operating expenses.

The United States Commissioners are now examining the section last completed, which carries the road a distance of 425 miles west of Omaha, and the work goes steadily forward two miles per day. Some interesting facts relative to the financial condition of the company will be found in their advertisement in another column. There can be no doubt but that the bonds of this road are perfectly safe as investment and their rate of interest is better than that on government bonds at present rates.

PROTECTION FOR PASSENGER CAR PLATFORMS.

In the State of Connecticut all railroad companies are by law required to protect the car platforms so that passengers cannot fall between them when in motion. On the Naugatuck railroad they use a board fastened at one end by a pin to one of the platforms, the other end resting upon the other platform without fastening. We witnessed a very narrow escape from accident on one of these cars the other evening, in the attempt of a passenger to pass the plank when the train was in motion, the brakeman having forgotten to insert the fastening pin.

We also observed a somewhat similar defect on the New Haven cars the other day, where the footway between the cars consists of a series of diagonal rods pivoted together like "lazy-tongs" so as to yield and contract under the variations of the buffer springs. In this instance one of the end staples of the footway had become wrenched out by the jerkings of the car, leaving passengers exposed to the danger of falling through.

The contrivances used on both of the above roads are unsafe and badly suited for the purpose. No sort of device should be employed which is liable to be deranged by the jolting of the car, or which depends for its safety upon the watchfulness of careless brakemen.

We hereby notify President Bishop of the insecurity of the said passage ways, and we warn passengers against stepping upon them without first making sure that the fastenings are in place.

One of the best devices that we have seen to fill the space between the platforms, is that used on the New Jersey Railroad, which consists of a spring frame extending entirely across each platform end. The frame is covered with leather or stout canvas and when the cars are coupled the frame of one car presses constantly against that of the opposite car, completely filling up the space between the platforms, and requiring the insertion of no fastening pins and no attention from brakemen. It is a self-acting arrangement.

FRANCE AS A POWER.

Napoleon said, some months ago, that "a nation's power depends on the number of men it can bring under arms." This is the opinion of a soldier, hardly that of a statesman, judging from his consequent action. To prove the correctness of his theory he musters into his standing army the flower of the male population of his empire, yet with a population considerably larger than ours he could not by any means bring the numbers into the field which we did during the five years of our recent struggle, and the status of the physical material of his armies would be immensely below that of ours. The statesman would greatly modify or qualify this assertion, if he did not contradict it. France is a nation of soldiers, but as a power either for defense or offense she is far below the United States, which was not, before our late war, and is not now, a military nation as the term is understood in Europe.

Le Fort in a paper in the *Revue des Deux Mondes* easily refutes the Emperor's logic, if there is logic in his bald statement. He says that, as compared only to the rest of Europe, the French population is almost stationary. Denmark and Sweden double their population in 63 years, Spain and Norway in 57, Russia in 66, Greece in 44, England in 52, Prussia in 54, France in 198. France has only 268 births yearly for every 10,000 inhabitants, while England has 347, Prussia 374, Austria 409, and Saxony 410. And the falling off has been rapid; for just before the revolution of July the proportion of births was quite 307 per 10,000. The percentage of infant mortality is much the same in France and in England. The difference is that in the former country the absolute number of births is so lamentably small. Nearly a quarter of a million of people of both sexes are kept by holy vows out of the reproductive class. The grand evil is late marriages, fostered to a great extent by the military law. In this way 80,000 young men are taken off every year for the seven best years of their lives. And when the soldier's term is over, he has very often got entirely out of domestic habits. If he marries, it is not till he has provided a home and secured a fixed income, so that the term of his celibacy fully averages ten instead of seven years.

The marrying age in France is just over 30 for men, just over 26 for women; in England it is 25 for men, 24 for women. At 27, you find in France 582 bachelors and 418 husbands out of 10,000; in England the proportion is nearly reversed. Further, these 80,000 men drawn for service in the army, are the pick of the whole population; and of these fully one-third is returned tainted with contagious diseases. As to the fallacy that the French pass more recruits per cent now than they used to pass, "that is just because we want more soldiers, and are therefore less particular. In the Crimean war we actually passed 69 and 70 per cent, instead of the usual 60—the hospitals and graveyards out in the East knew with what result. It stands to reason that if the vast force provided for by the new law is to be kept on foot, France must either be rapidly depopulated, or the term of service must be considerably shortened.

We cannot see why the militia system of this country or the volunteer system of England might not be as advantageous and as effective for France as for the United States and England.

THE TOMATO.

The vast improvement in means and methods of agriculture is often remarked; indeed, one must be blind not to recognize it; but it is seldom we notice the additions made to our edibles not only by improvement of species producing new varieties, but by the introduction of entirely new in-

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dividuals. They come so gradually into use that they are familiar to us before we have remarked their novelty. Thirty years ago the varieties of garden esculents were very few. Green corn of the sweet variety was but little cultivated; pumpkins and the Canada crook-neck filled the places now usurped by many much superior squashes; the celery was merely a garden herb under the name of "loveage;" cauliflower and kale were rare, and the tomato or "love apple" was almost entirely unknown.

Our first knowledge of this now deservedly esteemed vegetable was its advertisement as a medical plant. It is known to botanists as the *Lycopersicum esculentum* or the *Solanum lycopersicum*, and belongs to the order which includes the deadly nightshade. One of our exchanges says:

It is generally supposed, to be a native of South America, and to have been cultivated at an early period by the people of Peru and Mexico. It made its appearance in Europe in the 16th century, the first mention of it being by Rembert Dodoens, the famous Dutch herbalist, whose work, published in 1583, speaks of tomatoes as vegetables which may be eaten as a sort of salad with pepper, salt and oil. John Gerarde, an Englishman, whose "Herbal" was given to the world in 1597, tells us that in his time, several varieties were to be found in the gardens of his country. Half a century later, in 1656, John Parkinson, another English writer on plants, treats of them as garden curiosities, cultivated more for their beauty of appearance, than for utility. He styles them sometimes love apples, sometimes amorous apples.

It is noteworthy that the several species of *Solonacea* are called *tomatl* by the Mexicans, and we thus find an Aztec word current in southern Asia—an extraordinary philological phenomenon which would seem to establish some sort of connection, at a very remote age, between the old and the new worlds.

Notwithstanding the fact that the tomato was known to be used as an article of food by several semi-civilized races, it was long before the people of any enlightened nation ventured to introduce it on their tables. For more than 150 years after the death of Parkinson his description of its position in Europe continued to be the correct one. It was grown to a limited extent merely as an ornamental plant.

Its real name took the place of "love apple," by which the last generation of Americans knew it. This latter designation indicates that it was introduced into Europe through some of the Latin nations. The French style it *pomme d'amour* or "love apple." The Italians, by whom it is now cultivated, called it formerly *pomo d'or*, or "golden apple," but now universally designate it *pomo d'amore*, or "love apple." The German name is "paradise apple;" the Swedes and Danes have no title for it, it being unknown in the north of Europe. It is singular that the United States, where it had been known only a comparatively short time, should be the first to makes it a common article of diet. In Germany and France it is scarcely employed except in the manufacture of sauces, and to give a flavor to soups, and even in Italy, with a climate admirably adapted to its culture, it is far from holding the place which it does among us. In England, also, it is still regarded rather as a luxury than as an article of general consumption.

The large red tomato is the variety most commonly to be found in the market. But there are many others. These are the small red tomato, one kind of which is sometimes styled the cherry tomato, from its size and sprightly acid flavor, forming an excellent pickle; the pear tomato, very tender, but ripening very slowly; the large yellow tomato, which differs very little from the large red; the fig tomato, which, when dried, is prepared as a sweetmeat; and the perfected tomato, with a large juicy fruit, of either a scarlet color or a crimson tinted with violet. A species, denominated the Humboldt tomato, was brought to Europe some years ago from Peru, which is said to be a perennial, but which has not yet made its way to our gardens.

Important Archæological Discovery---Perhaps.

A member of the Copenhagen Royal Society writes to a Washington paper that he has found a wonderful Runic inscription on a rock near Georgetown, D. C. The inscription, a copy of which the professor furnishes, reads as follows:—

"Here rests Syasy, or Suasu, the fair-haired, a person from the East of Iceland, the widow of Kjoldr, and sister of Thorgr, children of the same father, twenty-five years of age. May God make glad her soul. 1051."

Just above this inscription is engraved on the rock the name "W. Langley, 1758."

On continuing his explorations the antiquarian came across some human teeth, two Roman coins, and several bronze trinkets.

From these discoveries the professor believes it to be proven beyond doubt, that the early voyagers, having left the New England shores—where their presence, centuries ago, is now generally admitted, the "round tower" at Newport having undoubtedly been built by them—they continued their journey Southward certainly as far as the mouth of the Potomac, which they ascended. In support of his conclusion, he refers to a manuscript lately dug out of some old ruins at Skahldt, Iceland, wherein the statement is made, that under the command of Herbardur, his countrymen sailed in a Southerly direction from Vineland (or Martha's Vineyard), where they wintered, and thence up a sea and various rivers, the ascent of one of which was stopped by a succession of falls, to which, from their shape and foamy appearance, the gave the name of Hvidsderk, or white shirt; and the manuscript further states that in this neighborhood the illegitimate daughter of Snorré was killed by a small spear (or arrow) and buried near the spot where she fell.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING JULY 16, 1867.

Reported Officially for the Scientific American

PATENTS ARE GRANTED FOR SEVENTEEN YEARS the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Resident of Canada and Nova Scotia pay $500 on application.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & Co., Publishers of the SCIENTIFIC AMERICAN, New York.

66,667.—INHALING FLUID FOR CURE OF CONSUMPTION AND OTHER DISEASES.—N. W. Abbott (assignor to H. W. Persing), Centralia, Ill.

I claim the combination and use of the ingredients herein named, as and for the purpose set forth.

66,668.—FOLDING GATE.—C. N. Ackerson, Bath, N. Y., and W. D. Harrah, Davenport, Iowa, assignors to J. C. Delany, Philadelphia, Pa.

1st, We claim the construction and arrangement of the several parts of the within-described folding gate, all operating together as herein set forth.

2d, The combination of the slide, f, and latch, e, with a cord, g, arranged substantially as and for the purposes described.

3d, The slide, f, in combination with the spring catch, e, the said slide serving as a means whereby to force the spring, e, out of contact with the gate, substantially as described.

66,669.—NET FOR FISHING, ETC.—Benjamin Arnold, East Greenwich, R. I. Antedated Jan. 17, 1867.

1st, I claim the use of the full-sized twine in connection with the strand or smaller twine, in making netting, substantially as herein set forth.

2d, I claim as a new article of manufacture, nets or netting, made as herein described.

66,670.—STEAM GENERATOR.—Henry Bevis (assignor to himself, Thomas H. Foulds, and W. D. Dalton), Cincinnati, Ohio.

I claim the steam chamber, C, and water chamber, B, connected by one or more annular series of ascending tubes or ducts, D, immediately surrounding the fire, and having downwardly-discharging terminations, G, above the crown sheet, and by one or more outer annular series of descending ducts, E, having their inlets flush with the top of the crown sheet, for the purpose set forth.

66,671.—ROTARY PUMP.—John P. Birch, Philadelphia, Pa., assignor to himself and George W. Paterson, Newburyport, Mass.

I claim the combination with the eccentric piston case and central pin or spindle, mounted in opposite ends of the pump case, of the pistons or buckets and their grooved and tongued supporting disks, mounted on said spindle, and within the piston case, substantially as shown and described.

66,672.—UPRIGHT DRILL.—P. Blaisdell, Worcester, Mass.

1st, I claim the combination with the sliding head piece, G, and bearing, F, of the upright spindle, E, provided with the collars, d m, and nut, o, substantially as set forth.

2d, The combination with the adjustable frame, H, and spindle, E, of the sliding head piece, G, screw shaft, e, collars, m d, and nut, o, constructed and arranged substantially as and for the purposes set forth.

3d, The combination of the sliding head piece, G, and bearing, F, with the adjustable frame, H, and spindle, E, arranged as and for the purposes set forth.

66,673.—SASH FASTENER.—Thomas H. Burridge (assignor to himself and G. C. Fabian), St. Louis, Mo.

I claim the combination of trapezoidal tongue, or series of tongues, d, with the spring, d', and the strip, D, the sash or blind, and the window stile, when acting substantially as and for the purpose set forth.

66,674.—REFRIGERATOR, COOLER, AND FILTER.—William P. Burwell, Chicago, Ill.

1st, I claim one or more ventilators, O, for ventilating the filling of a refrigerator without communicating with the interior, substantially as and for the purposes specified.

2d, In combination with the ventilators, O, I claim the arrangement of the ice box, K, in one compartment, and the dripping pan, F, filter, E, and reservoir, G, provided with a draw cock, H, in the other compartment, substantially as specified.

66,675.—NUTMEG GRATER.—Richard H. Chinn, Washington, D. C.

I claim the box, A, having a foraminous bottom, B, and below it a conducting tube, C, in combination with the nutmeg holder, E, fitted to slide within the box, A, handle, E', and sliding piston, K L, when arranged to operate in the manner and for the purpose specified.

66,676.—APPARATUS FOR MANUFACTURE OF GAS.—John C. Clapp, Homer, N. Y.

I claim the employment of a retort within a common stove for the distillation of gas, substantially as set forth.

I also claim the special combination and arrangement of the retort, B, pipes, D E and F, and sliding joint, I, with the stove, A, whereby the retort may be elevated to the top of the stove when not required for use, substantially in the manner and for the purpose specified.

I also claim the arrangement of the purifying vessel or vessels, H, under the stove, in combination with the retort, B, and connecting pipes, substantially as and for the purpose described.

66,677.—CAR COUPLING.—A. H. Clark, Fond du Lac, Wis.

I claim the combination of the sliding block, a, the hinge flap, b, and the coupling pin, d, with a draw-head on a railroad car, constructed and operating substantially as and for the purposes herein described.

66,678.—MACHINE FOR TENONING BLIND SLATS.—John J. and Thomas Clark, Elgin, Ill.

1st, We claim wheels, W and W", when used in combination with arch piece, P, constructed and operating substantially as and for the purpose described.

2d, Springs, H H", when used for holding the slat in slot, d, substantially as described.

3d, The combination of slide, R, and adjustable arms, x x", for the purpose substantially as set forth.

66,679.—HORSE RAKE.—John P. Hunter, Williamsport, Ind.

I claim, in combination with the rake head, A, and sled, E, the handle, F, standard, G, and elastic spring board, H, substantially as and for the purpose set forth.

66,680.—BEEHIVE.—Edwin Cox, Monroe, Wis.

1st, I claim a beehive having its sides or panels composed of one or more layers of paper, with outer protecting panels of wood, whereby the dampness within the hive is absorbed, substantially as herein set forth for the purpose specified.

2d, The inclined strips or plates, l, in the bottom of the spare honey box, F', in combination with the troughs or gutters, m, in the upper parts of the comb frames, G, substantially as and for the purpose set forth.

3d, The entrance boxes, H I, provided respectively with the moth box, p, tube, t, and stoppers, u, constructed and arranged substantially as described.

66,681.—CHURN.—John Cram (assignor to himself and James B. Thomas), Chicago, Ill.

1st, I claim the arrangement of springs, S S, or their equivalents, in combination with an oscillating churn box, A, substantially in the manner and for the purposes specified.

2d, I claim an oscillating churn box, A, provided with the springs, G G, or their equivalents, in combination with the stops, elastic or unelastic, substantially in the manner herein described.

3d, I claim the arrangement of the cream cutters, M, in combination with an oscillating churn, when provided with springs, G G, or elastic stops, S S, so as to operate in the manner herein specified.

4th, I claim, in combination with an oscillating churn, when provided with springs, G G, or elastic stops, S S, as specified, the arrangement of a butter gatherer or worker, L, or its equivalent, in the manner and for the purposes described.

5th, I claim the combination and arrangement of the oscillating churn, A, with the cream cutters, M, and the butter gatherer, L, substantially as and for the purposes herein specified.

66,682.—LOOM.—George Crompton, Worcester, Mass.

I claim, in combination with the lifter and depresser levers, hung upon fulcra in line with the cloth-making point, as described, the evener levers, connected to and actuated by the lifter and depresser levers, when the eveners are hung upon fulcra, in line with the fulcrum of the respective lifter or depresser, to which each is connected, substantially as set forth.

Also, in combination with the mechanism of a loom, a cloth roll having provision for locking it, either in connection or out of connection, with the mechanism through which it is driven, substantially as set forth.

66,683.—STEAM GENERATOR.—Jeremiah Darling, Cincinnati, Ohio.

1st, I claim the steam and water columns, G, when constructed and arranged as and for the purposes set forth.

2d, I also claim the pipes, J, when arranged with reference to the columns, G, as herein described, and for the purposes set forth.

3d, I also claim the coil or incline pipes, K, when arranged and combined with the posts, G, and dome, C, as herein described and for the purposes set forth.

66,684.—RECIPROCATING HARROW.—Jay Densmore (assignor to L. A. Densmore and Justus Day), Holley, N. Y.

I claim a reciprocating harrow operated by cranks, or their equivalents.

Also, the carriage, A A, behind the reciprocating harrow, as described.

Also, the driver's seat, B, in combination with the carriage, A A, as described.

Also, the wrist pin, n, the draft pole, D, the sleeves i and h, the joint, o, or their equivalents, the brace, g, the chains, c c c c, or their equivalents, the guards, s s s s, all in combination with a reciprocating harrow, as and for the purposes set forth and described.

66,685.—ICE CREAM FREEZER.—Joshua W. Dougherty and F. W. Gerecke, Newburgh, N. Y.

We claim the cylindrical center freezer, C, with the manhole, O, upper center step, R', center pin, d, on the bottom, in combination with the beater arms, U1 U2, and the outer cream vessels, B B, by the square step, M, substantially and for the purpose as specified.

66,686.—WASHING MACHINE.—Charles Draeger, Ladoga, Ind.

1st, I claim the employment of the weighted rollers, F, hung in slotted bearings in the oscillating frame, G, and arranged to operate substantially in the manner set forth.

2d, The semicircular washboard, in combination with the weighted rollers and oscillating frame, arranged and operating substantially as described.

66,687.—CHURN.—Noah Drew, Howell, Mich.

1st, I claim the employment of two dashers, B C, having chamfered and perforated wings, e, constructed and arranged relatively with each other on one staff, substantially in the manner herein described.

2d, The employment of revolving shield hooks, H, in combination with loop bearings, m, and recessed handles, E, substantially as and for the purpose herein specified.

3d, Hanging the lever, L, by the use of slotted straps, M, in combination with a fast pivot, l, projecting from each side of the arm, D, substantially as and for the uses set forth.

66,688.—EQUALIZING THE DRAFT OF HORSE-POWER.—Wm. P. Dunlap, Maquoketa, Iowa.

I claim the arrangement and combination of the segment, C, having the radius, D, with rods, J, spring, l, and arms, A, substantially as and for the purpose set forth.

66,689.—NUTMEG GRATER.—C. A. Durgin, New York City.

I claim, as a new article of manufacture, a grooved or concave grater, substantially as described and specified.

66,690.—HAND SAW.—A. W. Elmer (assignor to himself and Christian Ensminger), Springfield, Mass.

I claim, as my invention, the combination of the nut, C, in the end and forming a part of the handle, D, with the slit socket, A, the round hole to receive the shank, B, and the shank, B, with the end split to receive and hold the saw, substantially as set forth and described.

66,691.—PLOW.—Charles A. Elton, Hillsboro', Ohio.

I claim connecting the rear end of the beam, A, to the handle, B, of my improved plow, by means of the slotted and angular-shaped holder, d, and the bolts, c and e, as described, when the slots in said holder are of such a size and shape that by operating the bolt, c, the forward end of said plough beam can be varied and secured in any desired lateral position, and by operating both of said bolts, c and e, the forward end of said plow beam can be varied and secured in any desired vertical position, substantially as herein set forth.

66,692.—SAW.—James E. Emerson, Trenton, N. J.

I claim the provision in a saw of apertures, d, for faciliating, dressing, or sharpening, substantially as described.

66,693.—SAW GUMMER.—James E. Emerson, Trenton, N. J.

I claim the adjustable and reversible bearings, F F, constructed and applied to the curved stock, A A', in the manner and for the purpose set forth.

66,694.—WATER INDICATOR FOR BOILERS.—William R. England, Milwaukee, Wis.

I claim, 1st, The arrangement of the whistle lever, L, connecting rod, K, index hand, H, lever, F, and float, E, substantially as herein set forth.

2d, I claim the arrangement with reference to the first clause of claim of the glass tube, O, and whistle, M, substantially as herein set forth.

3d, I claim the arrangement of the adjustable collars, m and n, with the whistle lever, L, substantially as herein set forth.

66,695.—PLUMB LEVEL.—C. Ensminger and A. W. Elmer, Springfield, Mass.

We claim the parallel-sided hand, a, in combination with a semicircular graduated scale, o, as and for the purpose specified.

66,696.—HORSE RAKE.—Henry V. Farris, Richmond, Ind.

I claim the draw bar, e, posts, c c, and sliding pins, u u u, when operating and constructed substantially as herein set forth.

66,697.—PROPELLING HOOP.—James Faye, Philadelphia, Pa. Antedated July 11, 1867.

I claim the combination with the hoop of the guide, b, rollers, c d and e and stay, f, or their equivalents, the whole being substantially as above described and for the purpose herein stated.

66,698.—SAFETY POCKET.—Robert W. Fisk, Olney, Ill.

I claim a watch safe, consisting essentially of the plate, D, hook, e, prong, m and m', when combined and arranged to operate in the manner and for the purpose specified.

66,699.—HAY LOADER.—C. W. Gage, Homer, N. Y.

I claim the adjustable arm, E, upon the end of shaft, D, tongue, K, and spike m, sliding brake bar, L, in front of the rear wheels, B B, and rope, G, passing to the rear of the wagon, when combined, arranged, and operating in the manner and for the purposes specified.

66,700.—BRICK MACHINE.—Alois Gans (assignor to himself and John Moos), Lincoln, Ill.

I claim, 1st, The hopper, A', the molds, B B', and the carriage, B2, when combined with the actuating devices, a2 C C1 C2 and C3, substantially as described and set forth.

2d, The combination and arrangement of the plungers, D', and the molds, B B', as described and shown.

3d, The plungers, D', when arranged as described in combination with the operating devices, a2 d d1 d2 d3 d4 d5 d6 d7.

4th, I claim the clutches, E, in combination with the molds, B B', as and for the purpose described and shown.

5th, I claim the clutches, E, when arranged as described, in combination with the operating devices, a2 e e1 e2 e3 e4.

66,701.—CASK FOR FERMENTING WINE.—John Glenert, Washington, Mo.

1st, I claim the combination and arrangement of the cask, A, pipes, B b, and tub, B', as and for the purpose set forth and described.

2d, The cask, A, and the filling device, C C' c c', when combined in the manner and for the purpose set forth.

66,702.—ELLIPTIC SPRING.—Robert Gray, Litchfield, Ill.

I claim projecting a rib, a', from the convex side of a leaf of the spring, so as to form a rounded parabolic curve or elliptical curve, as shown in fig. and substantially for the purpose set forth.

66,703.—SMOKE CONDUCTOR FOR RAILROAD LOCOMOTIVES.—John Greacen, Jr., New York City. Antedated July 5, 1867.

I claim a smoke chamber, with an opening running longitudinally of the track, in combination with flues or chimneys as set forth, so that the smoke from the chimney of a locomotive while in motion may be received by said chamber and conveyed away, as specified.

66,704.—POTATO DIGGER.—I. M. Green, West Bloomfield, N. Y.

I claim, 1st, The hand potato digger consisting of the sliding and self-clearing fork, G, lever, D, main frame, B, wheels, A, and spring tread arm, H, the whole arranged, combined, and operating in the manner and for the purpose specified.

2d, The special combination of the clearing bars, g g, with the sliding fork, G, in potato diggers, as herein described.

3d, The combination of the spring tread arm, H, with the hand-wheel potato-digger, A B, operating as and for the purpose herein specified.

66,705.—PORTABLE FIELD FENCE.—C. S. S. Griffing, Astabula County, Ohio.

I claim the mode of attaching the panels together by lapping over the ends of the boards, A, on each side of the slats, B, so as to brace the ends and also adjust them to the inequalities of the ground, as herein described.

66,706.—AIR BED.—J. R. Hamilton, Portland, Oregon.

1st, I claim the button-headed screw and cap-nut stay fastening, as constructed and combined with the air-tight or waterproof fabrics, for the purpose herein specified.

2d, I claim the self-closing puppet valve and tube with the screw and plates when constructed as described and used in combination with air beds, substantially as and for the purpose herein set forth.

66,707.—COAL STOVE.—John L. Hanson, Boston, Mass.

1st, I claim the combination as well as the arrangement of the fire chamber, A, the two chambers, B C, the descending pipes, F F', the flue space, G, the ascending pipes, H H, their chambers, Z, and the oven flue space or chamber I, and its escape flue or passage.

2d, I also claim the combination and arrangement of the flanges, k l m n, with the dished oven or with the same, the flue space, I, the series of pipes, H, the flue space, G, the pipes, F F', the chambers, B C, and the fire chamber A.

3d, I also claim the combination as well as the arrangement of the series of holes, t t, and their covers, as set forth, with the flue space, I, the pipes, H F F', the flue space, G, and the chambers, A B C.

4th, I also claim the combination as well as the arrangement of the passages, y y, the flue space, G, the chambers, A B C, the pipes, H F F', the flue space, I, and the chamber, Z, the whole being substantially as hereinbefore explained.

5th, I also claim the combination as well as the arrangement of the flange, g, and the lining guard, h, with the grate-holding partition, c, made with a hole through it to receive a grate as specified.

66,708.—SORGHUM EVAPORATOR.—W. H. Henderson, Litchfield, Ill.

I claim, 1st, The combination and arrangement of the chimneys, B B', and their connecting trough, D, with reference to the boilers, A A1 A2, as described and set forth.

2d, The arrangement of the dampers, C C1 C2 C3, as described and set forth.

66,709.—BREECH-LOADING FIRE-ARM.—A. J. H. Hilton, Boston, Mass., assignor to Joseph A. Robbins and Wm. L. Thompson.

I claim, 1st, The breech block, f h i, constructed as described, and moving obliquely to the axis of the barrel, so as to simultaneously close the breech and explode the cartridge, substantially in the manner set forth.

2d, I claim the lever, o o', operated by the forward or returning movement of the trigger guard, E, for the purpose of ejecting the empty cartridge case, substantially as described.

3d, I claim the combination of the sere spring, G, with the trigger, L L', and trigger guard, E, as and for the purpose specified.

66,710.—WINDOW-SHUTTER HOLDER.—William F. Hofman, Philadelphia, Pa.

I claim an improved shutter holder formed by the combination of the bar, F, and pieces, E and G, when said bar is formed with notches or strait parts, the planes of which are at an angle with each other, substantially as herein shown and described and for the purpose set forth.

66,711.—RAILROAD CHAIR SLEEPER.—Robert M. Holland, Philadelphia, Pa.

1st, I claim a sleeper consisting of a cast-iron beam or girder, to which are connected the above-described devices or their equivalents for securing the rails to the top of the girder, and permitting their withdrawal therefrom.

2d, The girder, A, with their recesses, h, in combination with the blocks, B, and links, C, the whole being constructed and arranged substantially as described for the purpose specified.

66,712.—VISE.—A. Jameson, Trenton, N. J.

I claim the combination of the jaw, A', its hollow shank or arm, C, and screw, D, and the slotted jaw, A, and nut, E, when the latter is arranged within the slot or opening in the jaw and connected to the same as described

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66,713.—COMBINED COTTON SEED PLANTER AND FERTILIZER DISTRIBUTOR.—James Johnson, Northampton County, N. C.

1st, The combination of the teeth, G, and plows, H, with the adjustable drag bars, E, and rollers, R, as herein described and for the purposes set forth.

2d, I also claim the arrangement and combination of the hoppers, C, with their adjustable slides, D, and operated by the lever, J, as herein described and for the purposes set forth.

3d, I also claim the vibrating apron, S, with its diverging grooves, for the purpose of sowing broadcast.

66,714.—ROUNDABOUT TOY.—F. H. Keeney, Newport, Ky.

I claim a "Roundabout" or Flying Dutchman, substantially as described, and adopted to be propelled by the rider or riders by means of one or more cranks and pinions.

66,715.—BROOM HEAD.—Elisha Kelley, Locust Grove, Ohio.

I claim the construction of wire racks in combination with hinged or permanently fixed casings or sides, substantially in the manner and for the purpose as herein set forth.

2d, The combination of the stay with the wire racks, substantially in the mannner and for the purpose as herein set forth.

66,716.—MACHINE FOR DRESSING STONE.—Francis L. King, Worcester, Mass.

1st, I claim the self-adjusting spindles, K, and their holders, H, for rotating the upper stone, in combination with the reciprocating bed, C, for carrying the lower stone, when constructed, arranged and operating substantially as set forth.

2d, The combination of the boxes, N, and rotating collars, L, with the sliding spindles, K, constructed and operating essentially as and for the purpose specified.

3d, The self-adjusting frame, S, carrying the lower journal box, N L, in combination with the spindle, K, and holders, H, operating substantially as and for the purpose deserihed.

66,717.—CORN CULTIVATOR AND POTATO PLOW.—John Kurtz, Clinton Township, Pa.

I claim, 1st, The slotted side pieces, B B, with their top and bottom bars or plates, C C, and adjustable uprights, E E, as arranged and combined with the reversible plows, H H, as herein described and for the purposes set forth.

2d, I also claim the slotted side pieces, B B, with their bars, C C, for the purposes set forth.

66,718.—APPARATUS FOR SIFTING COAL.—Samuel Langmaid, Lawrence, Mass. Antedated June 28, 1867.

I claim the pivoted tilting box, A, constructed substantially as shown and described, in combination with the gate, E, crank shaft, F, cams, G, and inclined screen, H, with or without the springs, h, the whole arranged to operate substantially as and for the purpose set forth.

66,719.—CUTTER HEAD FOR PLANING MACHINES.—Henry A. Lee, Worcester, Mass.

I claim a matcher head constructed in the peculiar manner above described and as shown in the drawings, so that it may be used equally well in lieu of either a closed or an open matcher head, as and for the purposes set set forth.

66,720.—MOP WRINGER.—Augustus S. Lesner (assignor to himself and A. L. Noyes), Boston, Mass.

I claim the arrangement in connection with a pail or bucket placed upon a platform, as shown, of levers, e, carrying rolls, f f', and attached to treadle, C, by links, d, all operating together with each other and in combination with the reaction spring, h, as and for the purpose described.

66,721.—STEAM ENGINE.—Henry O. Lothrop, Milford, Mass.

1st, I claim the combination or mechanism whereby the two rods, F F, of the engine pistons are enabled to effect rotary motion of the crank, N, or its shaft, O, as set forth, such combination consisting of the cross head, c, the slide or carriage, R, the connecting rods, G, H, and shaft, K, the lever, I, the arm, L, and the connecting rod, M, the whole being arranged and applied together, substantially as specified.

2d, I also claim the mechanism or combination by which the piston is kept stationary for a period during the passage by and beyond the dead point of the crank, such being for the purpose hereinbefore described, consisting in the stationary cam plate, S', and the sliding and studded crank, N, constructed and applied together, and to the standard, Q, and the shaft, O, substantially in the manner and to operate as specified.

3d, I also claim the combination of such mechanism or its equivalent with one or more cylinders, their piston or pistons, and a crank so connected with the piston or pistons as to be capable of being revolved thereby.

4th, I also claim the combination or mechanism for supplying steam to and discharging it from the cylinder and its three pistons, as specified, the said mechanism consisting of the two rotary valves, U U', their cases, T T', and inlet and exhaust chambers, f g, and ports, constructed and arranged together, and with the pistons and cylinder, substantially in manner and so as to operate as specified.

66,722.—PLATFORM SCALES.—C. C. Lyman, Edinboro', Pa.

I claim, 1st, The rack, F, inclined planes, E, and cog wheel, K, as arranged in combination with the platform, B, for the purpose and in the manner as set forth.

2d, The grooved pulley, J, and rope, L, or its equivalent, as arranged and operating the pulley, J, in the manner and for the purpose described.

3d, I claim the use of inclined planes or their equivalents, for the purpose of raising and lowering the platform, substantially as specified.

66,723.—BRICK MACHINE.—Gaylord Martin, (assignor to himself and George Burham,) Milwaukee, Wis.

1st, I claim revolving grate F', cutters G', and rollers H, in combination substantially as and for the purpose described.

2d, Adjusting nut H, screw M, slide G, pitman F, yoke I, slide L, and follower K, in combination substantially as described.

3d, Followers K, when made with pipes K', substantially as described.

4th, Jointed lever Q, shaft R, lever S, cams T, and weights X, in combination for the purpose of holding the stove door shut against any ordinary pressure, and when the stove door is opened by extraordinary pressure to lower the platform at the same time, and to shut the door and raise the platform simultaneously when the extraordinary pressure is relieved.

5th, Lowering platform U, simultaneously with opening stove door P, and closing said door and raising the platform automatically substantially as described.

6th, Slide C', jointed lever D', rocker shaft B', slotted lever A', pitman Z, and roller E', in combination with crank and crank shaft Y, substantially as and for the purpose described.

66,724.—GLOBE VALVE FOR STEAM ENGINES.—E. C. Mayer, and Jacob Guppenthal, St. Louis, Mo.

We claim the valve case B, and the valve D, when combined with the globe A, in the manner and for the purpose set forth.

66,725.—COMPOUND FOR DESTROYING INSECTS.—A. McDougall, (assignor to McDougall Brothers,) Manchester, Eng.

I claim the employment of and use of the oil obtained (after the naptha or spirit has been removed) in the distillation of tar resulting from the destructive distillation of carbonaceous substances or of any of the constituents of this oil, in combination with an alkali or an alkaline earth, and with fatty or other saponifiable substances, and with an acid hereinbefore described as a dressing for sheep or other animals to destroy or to protect them from vermin or insects, or as a soap for disinfecting or clearing purposes, and as a protection to the skin from the attack of insects and when such oil or any of its constituents after treatment with an acid, is combined with an alkali or alkaline earth. I employ the same as a material for the disinfection of foecal swage or other matters and the destruction of entozie paracites contained therein or for the destruction of entozie paracites or vermin in soils.

66,726.—PRINTING PHOTOGRAPHS.—Carl Meinerth, Newburyport, Mass.

I claim the interposition of any transparent medium, or a mat between the negative film and the printing surface, for the purpose of producing the effect as shown in the enclosed specimens.

66,727.—WEATHER STRIP.—Joseph Miller, Alliance, O.

I claim supporting the weather strip C, to the door in the groove by means of the brackets D, provided with the lip a, combined in the manner and for the purpose substantially as set forth.

66,728.—LACER FOR KNEE BRACES, ETC.—Joshua Monroe, (assignor to himself and Gardner,) New York City.

I claim a lacer for knee braces, artificial limbs and splints which is made in two parts connected by lacing strings or othe suitable adjustable fastenings in front and in the rear to operate in combination with the joint C, and socket B, substantially as and for the purpose described.

66,729.—HINGES.—George R. Nebinger, Lewisburg, Pa. Antedated July 5, 1867.

1st, I claim a hinge consisting of the wings A and B, in combination with the plates C, constructed and arranged as shown and described.

2d, The arm a attached to the pin that unites the wings and having the shoulder e, thereon, as and for the purpose set forth.

66,730.—HORSE HAY FORK.—D. F. Neikirk, Republic, O.

I claim the hay fork with curved or angular tines, a central support D, a bail which affords end supports and to which the hoisting rope is attached and a pivoted connection which passes through the fork at a point near the curve or at the angle of its tines when such fork has its spring catch arranged on its central support D, and also has a loop E, attached to or formed on the bail, all of the said parts being arranged and operated substantially in the manner and for the purpose herein described.

66,731.—WASHING MACHINE.—Ingwer P. Nissen, Davenport, Iowa. Antedated March 12, 1867.

I claim the combination of the sides B, the zinc bottom C, with the braces D, and triangular ribs K, when the same is pivoted and hung upon the standards A, as and for the purpose specified.

66,732.—ARTICLE OF FOOD FROM OYSTER JUICE.—Butler G. Noble, New York City.

I claim the extract of oyster as a new article of manufacture, the same being the natural juice or liquor of the oyster, concentrated by evaporation to a state of dryness, substantially as and for the purposes herein set forth.

66,733.—CAR COUPLING.—A. V. B. Orr, Steeleville, Pa.

I claim in an automatic car coupling the combination of the stop D, with the spring S, and the link supporting device a, with its spring g, all constructed, arranged and operating as described for the purpose set forth.

66,734.—STOP MOTION FOR LOOMS.—W. Pilkington, Frankford, Pa., D, Pilkington, Chester, Pa.

1st, We claim the combination of the fork f, lever s, finger b, and stand a, constructed and operating as and for the described purpose.

2d, We claim the combination of the swell e, lever c, and lever s, as and for the above described purpose.

66,735.—WATER WHEEL.—Frederick Post, Plano, Ill.

I claim the cap E, in combination with wheel g, having buckets h, and I, the latter being curved downward at the bottom, the whole being arranged substantially as and for the purposes set forth.

66,736.—GOLD WASHER.—I. F. Quimby, Rochester, N. Y.

1st, I claim passing the gold bearing sand or other material to be washed through an upward or counter current of water for the purposes herein shown and described.

2d, The employment of the agitator, constructed, arranged and operating in combination with the tubes E, C, and G, substantially in the manner and for the purposes set forth.

3d, The water box B, when constructed arranged and operating conjointly with the deposit chamber A, and the supply or induction tube T, and the vertical discharge pipe, G, for the purposes set forth.

4th, The general construction and arrangement of all the parts, substantially in the manner and for the purposes herein shown and described.

66,737.—BARREL STAVE JOINTER.—M. Randolph, St. Louis, Mo., assignor to himself and J. S. Todd.

1st, I claim the automatic feeding grippers, F', f f1 f2 and f3, for the purpose of conveying staves to and from the jointing knives, substantially as described.

2d, I claim the jointing knives, G and G', when arranged in combination with the table, A', and the feeding grippers so as to allow two staves to be jointed on opposite edges simultaneously and at one stroke or revolution of the machine.

66,738.—CHARCOAL FURNACE.—A. J. Redway, Cincinnati, O.

I claim the combination with the shell or body, A, having interior flues or channels, a a, and air inlets, I I', at its opposite sides of the detachable grate or fire basket, E e, having a cremulated edge, f f, perforations or caliducts, F, and air openings, G G, all as herein described and for the purpose set forth.

66,739.—IMPLEMENT FOR WAGONERS.—John Richards, Washington, D. C.

I claim the improved implement for wagoners constructed and arranged substantially as herein described and for the purposes set forth.

66,740.—WASHING MACHINE.—Milo A. Richardson, (assignor to himself and Alva F. Jennings,) Sherman, N. Y.

1st, I claim in combination with the wash tub, A, the washing apparatus, constructed substantially as described, centrally attached to the bottom thereof when in use, and readily removable when not required, substantially as set forth.

2d, I claim the series of bed rollers, D D, spirally grooved in alternating directions in combination with the driving rollers, C, arranged and operating substantially as set forth.

3d, I claim a convex surfaced roller, C, provided with serrate grooves as described the bed of which are parallel, and not with the surface thereof, substantially as and for the purposes set forth.

4th, I claim the hook headed spring connections of the heads, g, shanks, 1, and coiled springs, h, for holding the working roller adjustably in its bearings and permitting ready disconnection therefrom substantially as set forth.

5th, In combination with the washing machine as described, I also claim the device for clamping the frame, B, to the tub, consisting of the bent bolt P, clutch block, Q, and thumb screw, t, arranged and operating substantially as set forth.

66,741.—HAY RAKE AND LOADER.—F. M. Robinson, and T. G. Springer, Conneautville, Pa.

1st, We claim the hooked or bent spring teeth, d, applied to the revolving drum D, guided by means of bars C, and acted upon at proper times so as to leave the hay upon the endless carrier G, by means of rods, g, and cams or inclined bars, E', substantially as described.

2d, The hooked or bent spring teeth, d, applied to a revolving drum D, guided by means of bars, c, and acted upon at proper times so as to leave the hay upon the endless carrier G, by means of rods, g, and cams or inclined bars, E, substantially as described in combination with the spring rake, E, the teeth of which are arranged so as to rake up the hay and also serve as guards for the spring teeth, d, in elevating hay, substantially as herein specified.

3d, The hooked or bent spring teeth, d, applied to revolving drum, D, guided by means of bars, c, and acted upon at proper times so as to leave the hay upon the endless carriers, G, by means, substantially as described, of communicating a rapid rotary motion to said drum, D, so that the speed of this drum shall be greater than that of the driving wheels substantially as specified.

66,742.—PROPELLER.—Henry Rolle, Boston, Mass.

I claim the combination with the blades, c, and bars, b, of the long and short armed double cranks, D D', and cranks, F F', the whole being arranged for operation and for the purposes set forth.

66,743.—GRATE FOR STOVES.—J. J. Savage, Troy, N. Y.

1st, I claim a fire grate for stoves composed of a curved or angular formed lifting and hold back a grate part, D, having side or end pieces, G G, and suspended within the fire box by journals, F F, or their equivalents in such manner that it may swing upward for the purpose herein set forth, and having arranged to operate in combination therewith a horizontal grate part, C, which jointly with said grate part, D, constitutes said fire grate in manner substantially as herein described and operating for the purpose set forth.

2d, I claim the arrangement in combination with the fuel reservoir of stoves and front fire grate part C, thereof, of a lifting and hold back grate part, D, constructed substantially as described and arranged in such position thereto respectively as to operate for the purpose and in manner as herein set forth.

3d, In combination with a fuel reservoir of stoves and fire box thereof, I claim a lifting and hold back grate part, D, arranged in connection with a dumping or tilting grate part, C, in such manner as to be operated simultaneously by and with the same, as and for the purpose herein set forth, said grate parts respectively being constructed substantially as described.

4th, I claim the combination of a lifting and hold back grate part D, with a dumping or tilting fire grate part, C, constructed and arranged to operate by and in connection with each other in manner substantially as shown.

5th, In combination with a lifting and hold back grate or plate, D, and a fire grate, C, I claim a lifter arm, L, arranged substantially in manner as herein described and for the purpose set forth.

66,744.—ARTIFICIAL LEG.—F. Schmitt, Springfield, Ill.

1st, I claim constructing the upper and lower portions of an artificial leg, A and B, or either of them, of alternate strips of thin wood and cloth, substantially as and for the purposes specified.

2d, The pivot, 5, of the ankle joint, when located centrally as respects the length of the foot, and constructed and operating substantially as described.

3d, The combination and arrangement of the tenon, D, plate, 6, hinge rod, 5, and springs, 2 and 3, with the foot, C, and lower portion of the leg, B, forming the ankle joint, when constructed and operating substantially as specified.

4th, The combination and arrangement of the spring strap, 1, knee opening, f, calf opening, h, rule joint, 7, and cords or lacing, 9, with the upper portion, A, and lower portion, B, of the leg, forming the knee joint, when constructed and operating substantially as and for the purposes specified.

66,745.—TRENCHING AND HOISTING APPARATUS.—Albert G. Smith, Cleveland, Ohio.

1st, I claim the buckets, H, provided with the tilting straps, c, when arranged and operated conjointly by the pulleys, 1, ropes, J and N, cranes, D E F, and windlass, L, as and for the purpose set forth.

2d, The pulleys, a a', paws, M, as arranged and operating conjointly and in combination with the cranes, D E F, and buckets, H, in the manner and for the purpose described.

3d, The cranes, D E F, in combination with the frames, A B, and rollers, Q, for the purpose and in the manner set forth.

4th, The combination of a movable frame with one or more cranes and hoisting apparatus, so arranged over the ditch or channel being excavated that the cranes and hoisting apparatus will be self sustaining with said frame, when operating conjointly in the manner and for the purpose set forth.

66,746.—SHIFTING TOP FOR CARRIAGES.—Antoine Soursin, St. Louis, Mo.

I claim the combination and arrangement of the seat, A, its loops, a, and the knobs, a', the shifting rail, B, substantially as set forth.

66,747.—MACHINE FOR ADJUSTING CARRIAGE TOP BOWS.—Antoine Soursin, St. Louis, Mo.

1st, I claim an adjustable frame work, E F', when applied to a carriage body or seat in such a manner as to form a false work or frame on which to place and adjust the carriage bows or hoops preparatory to fixing the said hoops on the vehicle, substantially as herein described and set forth.

2d, I claim the bed plates, A A1 A2, when combined and arranged substantially as herein set forth, for the purpose of adjusting the machine laterally and longitudinally on the vehicle to which it is applied.

3d, I claim the posts, D. when combined with the pendulous posts, D1, and the adjusting arms, D3, as herein described and set forth.

4th, I claim the graduated beams, E, in combination with the beams, E1 and D, and the screws, E2 and e, as and for the purpose set forth.

5th, I claim the sliding stick I I' when constructed and employed as and for the purpose set forth.

66,748.—SULKEY PLOW AND TOBACCO HILLER ATTACHMENT.—James L. Spencer, Wellville, Va.

1st, I claim the combination and arrangement of the plows, G G1 G2 G3, with the arms, M M1, the rods, m1 m1, and the arms, l l, substantially as and for the purpose specified.

2d, The roller, L, having the short arms, l l, adjustable in position, and having the handle, l, substantially as and for the purpose described.

3d, The pole, T, having the shovel, t, and the blunt arm, t1, substantially as and for the purpose specified.

4th, The combination of the gear wheel, P, the pinion, g, the lever, R, the shaft, Q, bearing the wheel, S, and the pivoted pole, T, bearing the shovel, t, and the blunt arm, t1, substantially as and for the purpose described.

66,749.—APPARATTS FOR CARBURETING AIR.—J. H. Springer and John C. McDonald (assignors to themselves, Richard G. Howell and George Stiles), Philadelphia, Pa.

1st, We claim the perforated air tubes constructed, arranged, and operating as described.

2d, The combination of two carbureting chambers separated by a diaphragm traversed by air tubes, substantially in the manner described.

3d, The combination of the oil chambers and tank with the perforations, e, and shield, F, arranged and operating as and for the purpose described.

66,750.—EVAPORATING PAN.—Enoch E. Stubbs and Thos. C. Davis, West Elkton, Ohio

1st, We claim the skimming apparatus consisting of the trough, v, and tube, x, in combination with trough, w, and strainer, z, arranged at the elevated end of the pan, K, for draining the sirup from the extraneous matter, in the manner and for the purpose described.

2d, The spring catches, i i, arranged in the manner described upon the pan, B, to act in connection with the projecting edge of turntable, a, for holding the granulator and cooler, D, in position, in the manner and for the purpose specified.

66,751.—MAGAZINE FIRE-ARM.—E. L. Sturtevant, Boston, Mass.

1st, I claim the combination with a sliding breech or recoil block of a cartridge carrier, held in and actuated by but not forming part of said breech block, under such an arrangement that the breech block in its sliding movement shall cause the raising and lowering of the carrier, as herein specified.

2d, I also claim the carrier, e, in combination with the sliding block, C, and its groove or recess, s, for raising the cartridge into line with the barrel, as well as for expelling the empty shell, essentially in manner and to operate as explained.

3d, I also claim the employment of the carrier, e, and its spring, for the combined purpose of raising the cartridge and at the same time keeping back the supply of cartridges within the magazine, substantially as described.

4th, I also claim the peculiar mode of connecting the guard lever, D, to the sliding block, C, viz., by the dovetailed groove, l, and studs upon the lever, in manner and for the purpose as explained.

5th, I also claim the peculiar formation of the grooves, j j, whereby the cartridge carrier, e, is caused to rise and elevate the cartridge, and substantially to guide the carrier and cartridge forward in a line with the bore of the barrel, essentially as explained.

66,752.—APPARATUS FOR WARMING WATER BY PETROLEUM LAMP.—Charles C. Tainter, Springfield, Ill. Antedated June 26, 1867.

I claim the lamp, I, in combination with the air pipes, D D, and eduction pipes, C C C, when arranged to opeeate in vessel, A, in combination with boiler, H, as shown.

66,753.—MILK STRAINER.—Sidney Van Auken and James H. Graham, Binghamton, N. Y.

We claim the frame, A, and the mode of attaching it to the pail, in combination with the detachable strainer, G, and the spring, H, all constructed substantially as herein described and represented, for the purpose set forth.

66,754.—CLAMP FOR FILING SAWS.—E. E. Van Etten, Mount Morris, N. Y.

I claim the arrangement of the swiveled clamps, C D, the set screws, h g, key hole socket, r, and the groove, q, constructed and operating in the manner and for the purpose specified.

66,755.—HOOKS FOR WATCH CHAINS.—Antony Wallach (assignor to himself and Adolph Wallach), New York City.

I claim the hooks, a and b, united by the joint pi , c, in combination with the saddle, d, and swivel, as specified.

66,756.—ROCK DRILL.—Wm. Weaver, Phœnixville, Pa.

1st, I claim the drill rod, D, nut, N, and spring, k, bearing on the nut, in combination with the within-described devices or their equivalents, for first turning the nut on the drill rod and then elevating and turning both together, the whole being constructed and operating substantially as and for purpose specified.

2d, The drill rod, D, nut, N, with its projections, i, in combination with the shaft, L, and its peculiarly bent arms, s s, the whole being arranged and operating substantially as and for the purpose described.

3d, The tube, d, arranged in respect to the rod, D, and nut, N, substantially as and for the purpose set forth.

4th, The nut, N, consisting of two adjustable disks, f f', an intervening elastic washer, e, and set screw, 3, or its equivalent.

5th, The adjustable plate, l, or its equivalent, in combination with the spring, k, for the purpose as described.

6th, The combination of the frame, C, platform, A, legs, B, and bars, a2, the whole being constructed and arranged for adjustment substantially as set forth.

7th, The grove, e, in the rod, D, and set screw, 3, combined and operating substantially as set forth.

66,757.—STEAM GLOBE VALVE.—Joseph H. Webster (assignor to himself and John Kupferle), St. Louis, Mo.

I claim the bonnet, E, constructed with a blank end on the shank, H, and arranged in relation to the valve, valve stem, and seat, substantially as described, for the purpose specified.

66,758.—METALLIC PACKING FOR PISTON RODS.—Joseph H. Webster (assignor to himself and John Kupferle), St. Louis, Mo.

I claim in combination with the stuffing box, the solid alloy packing, c, when made of an oblong form and and arranged in relation to the stuffing box, rod, and gland, so that the screwing down of the latter will contract the two ends of the packing around the rod, as shown and described.

66,759.—DEVICE FOR CLEANING GRAIN.—P. G. B. Westmacott, Elswick, Newcastle upon Tyne, Eng. Patented in England Nov. 21, 1866.

I claim arranging machinery for conveying and treating corn, grain, or other articles in bulk, substantially as hereinbefore described, and especially with a rapidly traveling band on to which the grain is delivered down an incline or shoot, in such manner that the material when it comes upon the band may be traveling approximately in the same direction and at the same speed as the band.

I also claim the bending up the band into a tray-like form, at the point where the grain or material is fed on to it, substantially as herein described.

I also claim the arranging the said machinery in such manner that the carrying band may be deflected at any point where it is desired to remove the grain or material from it in such manner as to cause the grain or material to leave it and shoot forward into a guide trough or shoot by which it is led away, substantially as herein described.

I also claim the cleansing of corn, grain, or other articles by throwing it off at such a velocity from the band that the lighter particles and dust are by the resistance of the air separated from the bulk, substantially as herein described.

I also claim the arranging the said machinery in such manner that by deflecting the carrying band it may be caused, where desired, to give motion to a transverse band, or to distributing and conditioning apparatus, substantially as herein described.

I also claim the distributing and conditioning corn, grain, or other article by causing it to descend on to the cone or instrument with radia from rotating on a vertical axis, substantially as herein described.

66 760.—CARRIAGE CURTAIN BUTTONHOLE.—Edwin L. Yancey, Utica, N. Y.

I claim the plates, A B, arms, G, and slide, D, as arranged in combination with the curtain, I, for the purpose and in the manner as set forth.

66,761.—CARRIAGE CURTAIN BUTTONHOLE.—Edwin L. Yancey, Utica, N. Y.

I claim the plate, C, provided with the arms, D E, and cap, H, as arranged in combination with the curtain, G, for the purpose and in the manner as set forth.

66,762.—BRUSH.—Albert A. Young (assignor to himself and George T. Dalton), Boston, Mass.

I claim the combination and arrangement of the handle, C, the shank, a, and its groove, b, with the metallic plates, d d, the set screw, c, and the pivot, e, whereby the handle is reversed with reference to the body of the brush, substantially as described.

66,763.—MACHINE FOR CUTTING DOVETAILS.—Calvin Young, Auburn, N. Y.

I claim, 1st, The combination of a hollow chisel two of the sides of which are parallel but of unequal length, and the remaining two sides of which are not parallel but are of equal length, and one or more augers working in or through said hollow chisel, for the purpose of cutting dovetails, substantially in the manner described.

I also claim in combination with two chisels whose cutting edges are held together by a spring or yielding attachment, the studs or pins which when moved into the path of the chisels cause them to spread laterally for the purpose of cutting down the back wall of a dovetail and cleaning out the corners or underneath portions, substantially as described.

66,764.—FARM GATE.—Isaac N. Young, Swann, Ind.

I claim the gate above described, having the movable bars, c c', the slotted uprights, D D D, the bolt and nut, e, the flanged balance bar, F, the three rollers, g g g, and the pin, p, all constructed and arranged substantially as and for the purpose specified.

66,765.—CLOVER THRASHER, HULLER, AND CLEANER.—Isaac N. Young, Swann, Ind.

1st, I claim the adjustable pick, G, working in the movable bearings, y y, substantially as and for the purpose described.

2d, The drums, g g', connecting or disconnecting with each other when in motion by the ratchet and pawl, substantially as and for the purpose specified.

3d, The combination and arrangement of the thrasher, B, the beater, F, the apron, E, the pick, G, the straw carrier, H, the table, W, the huller, I, the fan, K, the cleaning scives, L L, and the elevator, O, all constructed and arranged substantially as and for the purpose specified.

66,766.—WOOD SCREW.—Solomon W. Young (assignor to himself and J. W. Hoard), Providence, R. I.

As a new article of manufacture, I claim a gimlet-pointed screw having one or more grooves or indentations in the shank and thread thereof in the plane of, but obliquely to the axis of the said shank, that is to say, having the grooves formed between the point and cylindrical part of the shank, substantially in the manner and for the purposes set forth.

66,767.—BREAKING AND CLEANING HEMP.—Henry Zellner, Columbia, Tenn.

1st, I claim the combination of the beater, G, having the slats, g g, with the endless apron, F, having the slats, i i, substantially as and for the purpose described.

2d, The combination of the beater, G, pitmans, K K, crank shaft, I, idle wheel, O, cog wheel, P, shaft or roller, f', and apron, F', for the purpose of adjusting the motion of the apron, F, to that of the beater, G.

3d, The arrangement of the rapidly moving apron, F, in combination with the slowly revolving feed rollers, d', F, substantially as and for the purpose specified.

66,768.—COMBINED SEED SOWER AND ROLLER.—Henry Zellner, Columbia, Tenn.

I claim the combination and arrangement of the roller, C, arms, D D, roller, G, pitmans, H H, and the vibrating agitator or sifter, I, of a seed box, B, substantially as and for the purpose described.

66,769.—SOAP DISH.—Calvin Adams, Pittsburg, Pa. Antedated July 9, 1867.

1st, I claim a soap dish with two or more lugs or pins projecting from the bottom or edge of the dish in the manner, substantially and for the purpose shown and described.

2d, As an article of manufacture a cast iron soap dish in the manner substantially as shown and described.

66,770.—MATCH LIGHTER.—William Adamson, Philadelphia, Pa.

1st, I claim a match lighter consisting of a strip of paper or other material part of which is sanded or otherwise roughened, and part left plain for the purpose specified.

2d, The combination described of the sand paper, the advertising cord and strip of glass or mica.

66,771.—HARNESS SHAFT LOOP.—B. J. Aurand, Mount Gilead, Ohio.

I claim as a new article of manufacture a harness shaft loop constructed as described, consisting of the wooden or metallic ring, B, having raised flanges, a, upon its outer and inner sides between which are fitted flush with the periphery and inner circumference the continuous leather band and lining, as herein described, for the purpose specified.

66,772.—THILL COUPLING.—James Auten, Chile, N. Y.

I claim the combination and arrangement of the rubber blocks, b b, and the packing, f, with the clip made in two parts, c d, connected by bolt, E, as shown and described, and for the purpose set forth.

66,773.—PAINT COMPOUND.—D. R. Averill, Newburg, Ohio.

I claim a paint composed of the ingredients herein named and prepared and compounded substantially in the manner specified.

66,774.—PLOWS.—B. F. Avery, Louisvill, Ky.

1st, I claim the cast standard skeleton, D, constructed substantially in the manner herein shown and described, and for the purpose set forth.

2d, The point, F, and arm, f', constructed and attached to the skeleton, D substantially in the manner herein shown and described.

3d, the brace bar, G, constructed with lugs, g' and g2, and secured to the mold board, E, handle, C, and landside of the skeleton, D, substantially in the manner herein shown and described and for the purpose set forth.

66,775.—WASHING MACHINE.—J. G. Bailey, Hillsdale, Mich

1st, I claim the combination of the small roller, I, and apron, J, with the fluted cylinders, B and D, and with the box, A, substantially as herein shown and for the purpose set forth.

2d, The combination of the springs, E, and levers, F, with each other and with the journals of the roller, D, and box, A, substantially as herein shown and described and for the purpose set forth.

66,776.—PRINTERS GALLEY.—J. W. Baker, Warsaw, Ind.

I claim a printers galley having the detachable end piece, A, in combina-

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tion with the adjustable side stick, c, operated substantially as shown and described.

66,777.—APPARATUS FOR CARBURETING AIR AND GAS.—J. F Barker and C. N. Gilbert, Spring field, Mass.

1st, We claim the heating of the fluid of any carbureor used for the purpose of carbureting air or gas, by means of a heated fluid, the same being circulated in pipes and radiators through the carburetor and heater, substantially as herein described and set forth.

2d, The heater, B, having a case, B', filled with a non-conducting substance, and the coil, m' when used in combination with radiators placed inside a carburetor, substantially as herein described and for the purpose set forth.

3d, We claim in combination with a carbureting apparatus, a condenser, substantially as herein described, so as to cool the gas after being carbureted and before it passes into the distributing pipes for the purpose hereinbefore specified.

4th, We claim the use of the condenser, C, in combination with the carburetor, A, the radiators, c and T, and the heater, B, when constructed substantially as described and for the purposes herein specified.

5th. The valve, H h, in combination with the pipe, a, radiators, c and T, and carburetor, A, all constructed substantially as described and for the purpose herein specified.

6th, The heater, B2, having the space, O, between the two cylinders, l and l' with the inverted cone, n, having its base open and attached to the upper part of said cylinder, l, so that the interior of said inverted cone, n, shall communicate with the space, O, all constructed and operating substantially as herein described and set forth.

66,778.—GATE.—U. N. Bardsley, Goshen, Ind.

1st, I claim pivoting the large gate, E, at its middle part to the forward end of the small gate, A, the rear end of which is hinged to a gate post in the ordinary manner substantially as herein shown and described and for the purpose set forth.

2d, The combination of the arms, B, and rod, C, with the gates A and E, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the rod, K, with the rear ends of the gates, A and E, substantially as herein shown and described and for the purpose set forth.

4th, Securing the bottom board, e', of the gate, E, removably in place by the bolts, N and O, substantially as herein shown and described and for the purpose set forth.

66,779.—ICE PITCHER.—William Bellamy, Newark, N. J.

1st, I claim an ice or double walled pitcher provided with two lids hinged to the top of the pitcher at opposite or different points, substantially as and for the purpose specified.

2d, The spout, G, placed between the two walls and communicating with the bottom of the pitcher and the nozzle or spout thereof, substantially as and for the purpose set forth.

66,780.—MODE OF ATTACHING CALKS TO HORSE SHOES.—W. J. Berne, Cincinnati, Ohio,

I claim adjustable calks which may be applied to ordinary horse shoes without removing the latter, by means of the socket, A, toe piece, B, cross piece, D, and straps, C, substantially as described.

66,781.—HAMMER HEAD.—Robert Black, Holyoke, Mass., assignor to himself Martin Deviney and John Murphy, Chicopee, Mass. Antedated July 7, 1867.

I claim as a new article of manufacture a hammer head constructed of the parts, A and B, the part, B, be ng cast and attached to the part, A, substantially in the manner and for the purpose described.

66,782.—JOINT FOR IRON PIPES.—E. G. Blakslee, Sing Sing, N. Y.

1st, What I claim is the joint for cast iron pipes formed by a socket with two enlargements at one end of a length of pipe receiving the end of the next length of pipe and made tight by the packing, d, as set forth.

2d, I also claim forming the packing for the joints of cast iron pipes of a ring of soft metal cast in a separate mold and calked or driven into the joint as set forth.

66,783.—FLOUR BOLT.—S. H. Blossom, Buffalo, N. Y., and J. E. Huston, Hillsdale, Mich.

1st, We claim the bolts, C and E, constructed, arranged and operating as described to separate the feed from the meal, and the flour from the midlings consecutively.

2d, The secondary chamber, p, employed in combination with the chamber, p', as and for the purposes set forth.

66,784.—ATTACHING THILLS.—Charles Boyton, Lyons City, Iowa.

I claim the spring or rigid piece of metal, C, the packing, H, and the adjustable bolt, F, when constructed, arranged and operating substantially as and for the purposes above set forth.

66,785.—CONVERTING IRON INTO STEEL.—J. F. Boynton, Syracuse, N. Y.

1st, I claim in carrying the above described method into effect, the use of hydrocarbon gas surcharged with carbon by passing it through a carbonizing vessel and mixing or combining it with hydro-carbon vapors by any known means of producing that result.

2d, I also claim in carrying the above described method into effect, the use of other gases hereinbefore mentioned, when charged with hydro-carbon vapors.

3d, I also claim in carrying the above described method into effect, the use of atmospheric air charged with hydro-carbon vapors by any know means of producing that result.

4th, I also claim in carrying the above described method into effect, the heating of heavy hydro-carbons to cause their vapors more readily to mix or combine with the gases or air, and be carried forward therewith.

5th, I also claim melting iron or the nitro-carbonized compound after it has been converted into steel by the above described method and thereby converting it into cast steel as described.

6th, I also claim in carrying the above described method into effect, the use of hydro-carbon vapors without admixture with gas or air, as and for the purpose set forth.

7th, In carrying into effect the method herein described, of converting iron into steel, I claim coating a portion of any piece of iron with a wash as described, to prevent the portion so coated from being converted into steel.

8th, I also claim converting the oxides of iron directly into steel by one heating, by passing carbureted or carbonized hydrogen gas over and through the same when in a highly heated state according to the method or process therein described.

66,786.—MODE OF DRYING AND PURIFYING AIR FOR PRESERVING ANIMAL AND VEGETABLE SUBSTANCES.—Edwin D. Brainard, Albany, N. Y.

1st, I claim the improved method of drying and purifying the air in a close chamber at a low temperature for preserving animal and vegetable substances, substantially as herein described.

2d, The condenser, C, the collecting vessel, D, the pipes, a b, and the overflow box, c, or the equivalents of them or either of them in combination with a close chamber, A, when arranged to operate substantially as and for the purposes herein described.

66,787.—PLOW.—T. E. C. Brinley (assignor to himself and J. G. Dodge, Louisville, Ky.

1st, I claim the standard and landside cast in a single piece and provided with the flange, C, constructed as described.

2d, A plow consisting of the flanged standards as above described in combination with a separate mold board and point of cast iron as set forth.

3d, A plow consisting of the flanged standard as described in combination with a mold board and point made separately of steel as described.

66,788.—SHAVING CUP.—G. P. Brooks and James McGrady, Boston, Mass.

We claim the within described shaving mug, A, with its soap receptacle, B, substantially as described.

66,789.—ATTACHING THILLS TO VEHICLES.—J. D. Brunner, Doylestown, Pa.

I claim the bar, A, provided with the slot, o, as herein described when used with the head, D, and bolt, E, in the manner and for the purposes specified.

66,790.—FIRE-PROOF SAFE.—H H. Bryant, Boston, Mass.

1st, I claim a safe or similar structure provided with chambers or vessels for holding water or other suitable liquid and inclosed within an outer chamber or jacket for receiving the steam and vapor discharged from said chambers or vessels, as herein shown and set forth.

2d, The combination with one or more water chambers or vessels of an exterior steam air chamber or chambers, under the arrangement herein described so that the steam generated within the said water chambers shall be discharged through suitable vents or valves into the exterior steam chambers and thence into the open air, substantially as and for the purposes specified.

3d, Forming the walls of a safe or other similar structure of an inner water or other liquid compartment and an outer air or steam chamber communicating with each other and with the exterior of the structure as and for the purposes herein shown and set forth.

4th, In a safe or other suitable structure I claim the combination with a water chamber of suitable construction of a flexible tube and float or buoy, for conducting the steam from said chambers, as herein shown and described.

5th, The combination and arrangement with the steam and water chambers of the vents or valves for the eduction of steam from said chambers and for the introduction of the liquid into the water chamber, substantially as shown and set forth.

6th, The combination with the body of a safe or similar structure of ordinary or suitable construction of a door in which air or steam and water compartments are arranged as herein specified, the said compartments being provided with vents or valves arranged to discharge the steam generated in the water chamber, in the manner described.

66,791.—TELLURIAN.—S. P. Campbell, Buffalo, N. Y., assignor to himself and Francis M. Loring, Gloucester, Mass.

1st, I claim the elliptical guide way, Q, in combination with the stud, L, and operative mechanism of the instrument for the purpose of illustrating the ellipticity of the earth's orbit.

2d, The horizontal circle, p, constructed in two parts and graduated as described in combination with the globe of a tellurian.

3d, The traveler, D, and plate, K, having the connection and movements described in combination with the stud, L, grand wheel, G, guide way, Q, and cup, Y, or its equivalent, for the purpose of giving an orbital movement to the globe without changing the direction of its pole.

4th, In combination with the globe of a tellurian the eliptic plane or dial u u, constructed with an elliptical channel, as shown and described.

5th, The transparent zodiacal ring, v, as set forth and described.

6th, The dial, P, of a tellurian marked with the line of apsides, the equinoxial and solstitial lines, the months, the table of the equation of time, the signs and constellations of the zodiac, and the effect of the precesston of the equinoxes, as set forth and described.

7th, The traveler, D, provided with the shaft, H, pinion, J J, and racks, B B, or their equivalents, in combination with the plate, K, stud, L, and guide way, the whole operating as set forth to produce an illustration of the orbital movement of the earth.

8th, The grand wheel, G, and elliptical rack, R, in combination with the barrel, V, with its lower pinion and the wheel, W, at its upper end, for the purpose set forth.

9th, The grand wheel, G, elliptical rack, R, in combination with the barrel, V, with its lower pinion and the wheel, W, secured at its upper end the train, i, and moon wheel, X, for the purpose set forth,

10th, The wheel, X, with the arm, l, in combination with the arm, t, and inclined flange, w.

11th, The plate, U, provided with the index, y, in combination with the plate, s, and grand wheel, G, as set forth and described,

66,792.—WASHING MACHINE.—W. L. Camp, Holden, Mass.

I claim the combination of the revolving disk, D, having grooved floats, E, attached to it, each float being at a different distance from the center with the tub, A, having capped wings, F G, attached to it, substantially as herein shown and described and for the purpose set forth.

66,793.—HOP PRESS.—Newel Carpenter and James Hutchinson, White Creek, Wis.

We claim a novel arrangement for applying lever power to press hops or similar substances consisting of the blocks, F, provided with the dogs, e, and the hinged lever, G, provided with the flanged rollers, d, in combination with the ratchet plates, D, beams, C, and pawls, a, when arranged to operate as described.

66,794.—CORSET.—M. L. Changeur. Paris, France.

I claim the corset or boddice provided with bands, A, made detachable at their one end and adjustable at the other end, arranged and operating substantially as shown and described.

66,795.—FLOOD OR WASTE GATE.—W. L. Clark, Cambria, Wis.

I claim the combination of the three gates, B B C, arranged within a flume or box, A, and connected together, to operate in the manner substantially as and for the purpose herein set forth,

66,796.—INSTRUMENT FOR LAYING OUT STAIR RAILINGS.—Alexander Clow (assignor to himself and John Hendry), Erie, Pa.

I claim the herein described apparatus consisting of the standard, A, tracing arm, C, pattern, E, adjustable support, F, and foot clamp, G, arranged and operating substantially as and for the purposes herein set forth.

I also claim the combination of a trammel with the above claimed apparatus, arranged and operating substantially as and for the purposes set forth.

66,797.—PROPELLER.—William A. Cobb, Orange, Mass.

I claim the propeller constructed as described consisting of the frame, D, having the series of vertical paddles, E, and hung at each end upon the crank shafts, C, between the sills, A, said crank shafts connected by the crank wheels, F, and shackle bars, G, all operated directly from the engine by the driving bars, H, as herein shown and described for the purpose specified.

66,798.—COMBINED INSTRUMENT FOR WATCHMAKERS' USE. Charles E. Collins, San Francisco, Cal

I claim an improved instrument for watch makers' use formed by the combination of measuring gages for watch crystals, main springs, and wheel pinions, a revolving bench key and a case opener, all united and connected with one handle, substantially in the manner as herein described.

66,799.—BRIDGE.—G. W. Corey, Port Jervis. N. Y.

I claim the braces, a, shoe, f, and keys, g, all constructed and arranged as described and for the purpose set forth

66,800.—BRICK MACHINE.—F. F. Cornell. Jr., New York City.

1st. I claim a mold for forming bricks or blocks open on two of its contiguous sides.

2d, The movable mold block, M, with its outer side, f, tapered inward in a direction opposite to its motirn when discharging a finished brick and retained in position by the fixed block. K, having a correspondiug taper at f', and by ribs, j j, attached to the fixed blocks, K K.

3d, The gate, P, or its equivalents, provided with the dovetail slip, p, moving in the dovetail groove, p', in the side of the fixed block, K, as and for the purposes hereinbefore described.

4th, The bed plate, A, standards, T T, spindle, C, supporting roller, B, cross head, D, bolts, m m, groove, h, to receive the index bar, H, and groove c, to receive the flange, i, as and for the purposes hereinbefore described.

5th, The index bar, H, with a suitably beveled end moving in proper guides to engage with the notch, v, in the flange, i, or with any other mechanical device in combination with a movable table or nest of molds, as and for the purposes hereinbefore described.

6th, The swinging jaw, E, having lugs to which may be attached rods or frame furnishing resistance to the power used for moving the plunger forward when pressing a brick, as and for the purposes hereinbefore described.

7th, Beveling the upper faces of the fixed blocks, K, as and for the purposes hereinbefore described.

8th, The bed plate, A, plunger, L, index bar, H, mold table, I, flange, i, notch, v, supporting roller, B, cross head, D, and bolts, m m, standards, T T, and head bolt, F, all arranged as and for the purposes hereinbefore described.

66,801.—CONSTRUCTION OF BELL PULLS AND TRIPS.—Silas L. Covell, Troy, N. Y.

I claim the combination of the arm, A, with the trip, B, spring, C, and catch, D, constructed and operating substantially in the manner and for the purpose herein described.

66,802.—REVOLVING PLOW.—M. A. and I. M. Cravath, Bloomington, Ill.

We claim, 1st, The plow, A, combined with the axle, a, constructed as herein mentioned, as a new article of manufacture.

2d, The arms, e f g h, of different shapes and lengths as shown for the purpose of combining and operating two or more plows.

3d, The combination of the slides, F F, the bent levers, G G, the swivels, H H, the curved straps, I I, or any equivalent device, to operate the wheels, E E, in the manner set forth for the purpose herein mentioned.

66,803.—FANNING MILL.—A. B. Culver, Westfield, N. Y.

I claim combining in one machine the two motions for chaffing and separating by means arranged and operating substantially as herein described.

66,804.—HOSE AND OTHER COUPLINGS.—M. S. Curtis and W. D. Tewksbury, New York City.

1st, We claim the combination with the bevel rings or formations, b and c, on the male and female butts of the bevel-edged sliding block, E, when said sliding block is prevented from revolving and operated by means of a screw restrained from longitudinal play, substantially as specified.

2d, The combination of the swivel cap, F, screw, e, and sliding block, E, for operation in connection with the butts and their beveled rings or formations, all constructed and arranged essentially as herein set forth.

66,805.—MARINER'S COMPASS.—Samuel Custer, Salem, Va. Antedated July 12, 1867.

1st, I claim the combination of the lower battery magnet with the correcting battery above it, substantially as and for the purpose described.

2d, The combination of the correcting battery with the upper or main directive needle as well as the arrangement of adjustment position of magnets, as and for the purpose described.

3d, The combination of the main directive needle with the correcting battery below it, under its arrangement of two or more magnets, as and for the purpose herein described.

66,806.—MAGNETIZING COMPASS NEEDLE.—Samuel Custer, Salem, Va.

I claim the combination of a pair of magnets under the arrangement for opening and closing after the needle to be magnetized has been introduced, substantially as and for the purpose described.

I also claim the adjustment of the hinges by any mechanical arrangement which will produce the intended effect, substantially as and for the purpose described.

66,807.—FRUIT GATHERER.—M. Darling, Blodgett's Mills, N. Y.

1st, I claim a cloth table and frame divided in two parts, A C A' C', to facilitate its application and removal from the body of the tree, as herein described and for the purpose set forth.

2d, A cloth table and frame constructed in two parts, A C A' C', and each part made to fold up by joints or hinges, i i, substantially as herein shown and for the purpose described.

3d, Also the extension legs, g' G, in combination with the fruit gathering table, A, substantially in the manner and for the purpose set forth.

66,808.—STITCHING HORSE.—O. A. Dean, Champaign, Ill.

I claim the adjustable clamp, B, of a saddlers stitching horse arranged and operating as and for the purpose herein described.

66,809.—PLOW CLEANER.—C. P. Devereaux, North Newbury, Mich.

1st, I claim forming a wing or extension, d4, upon or attaching it to the rear side of the lower part, d3, of the cleaner, D, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the lever, F, with the connecting rod, E, and handle, C, substantialal as herein shown and described and for the purpose set forth.

66,810.—BANJO.—H. C. Dobson, New York City.

I claim so securing the frame for holding the parchmenu head of a banjo or other simular musical instrument to its rim or cylinder having the soundboard upon the back or under side as to leave an open space around and between the said parchment head frame and rim substantially as herein described and for the purpose specified.

66,811.—WASHING MACHINE.—J. G. Dodge, Louisville, Ky.

1st, I claim providing the rubbing frame with the additional hinged rod, i, located in the narrow space as described.

2d, Securing the series of slats in place by means of the rod, p, plate, d, and piece, m, arranged as shown and described.

66,812.—SCRUBBING BRUSH.—A. J. Doolittle, Hamden, Ct.

1st, I claim the brush provided on its back with the slotted boxes, F F, as and for the purpose set forth.

2d, The handle, C, provided with the spring prongs, D, when used in combination with the brush and its boxes as and for the purpose specified.

66,813.—FOLDING TABLE.—D. Doty, Detroit, Mich.

I claim the combination of the bolt, C, notches, a and b, and the hinged top when made for joint action substantially as herein described and for the purposes herein set forth.

66,814.—MILK PAIL AND STRAINER.—J. L. Drake, Boston, Mass.

I claim the utensil herein described consisting of the closed vessel, A, hinged cover, C, adjustable and removable funnel, f, and strainer, g, constructed and operating substantially as and for the purpose set forth.

I also claim in combination therewith the elastic ring, i, on the joint of tubes, D and E, arranged and operating in the manner specified.

66,815.—WASHING MACHINE.—D. Duncan, and E. R. Ridgley, Olney, Ill.

I claim the arrangement of the perforated and corrugated spring concave with the vibrating roller journaled in bearings in the lid operating substantially as described and represented.

66,816.—DRILL JAR.—James C. Eastman, Titusville, Pa.

I claim a pair of jars applied to drilling tools and other similar uses constructed of wrought iron and steel, combined and applied substantially as represented, and for the objects herein set forth.

66,817.—ATTACHING THILLS TO SLEIGHS ETC.—H. F. Edwards and W. C. Whiting, Worcester, Mass. Antedated July 8, 1867.

We claim the combination of the connecting rod, a, with a key, s, or its equivalent attached with any number of slotted eyes, c c c c, through which the rod, d, may pass and in which it may turn, the key, s, and the slots in the eyes, c c c c, being at such relative position as may be desirable or convenient in the manner and for the purposes set forth.

66,818.—CAN FOR LOOMS.—G. S. Faulkner, Staffordville, Ct.

I claim the double faced cam, C, when arranged on a shatt, B, and when provided with flanges, d e and f, in combination with the inclined blocks, D, on the treadle, the latter being provided with a pin, g, as set forth.

66,819.—ROSETTE ENGINE.—C. H. Field, Providence, R. I.

1st, I claim combining the rocking frame, C, with the mechanism which operates the graver, substantially as described.

2d, Combining the rosette wheel or pattern with the spindle which gives motion to the holding block by the toothed wheels, F and F', of different dimensions substantially as described for the purposes specified.

3d Combining the carriage which carries the graver with a pattern block, L', substantially as described for the purposes specified.

66,820.—PIPE COUPLING.—Benaiah Fitts, Newark, N. J.

I claim a pipe coupling constructed substantially as herein described.

66,821.—WATER WHEEL.—Seth Fletcher, Skowhegan, Me.

What I claim as my invention is the curb as made with the inclined scroll deflector, as specified, in combination with the wheel as made with the conical bottom, and having its buckets arranged as specified.

66,822.—WHITEWASH BRUSH.—Adam Foss, Wayne Co., Ohio.

I claim the leather strips, C, inserted in band, A, in the manner and for the purpose substantially as set forth.

66,823.—FARM GATE.—Geo. W. Fox, St. Joseph Co., Mich.

I claim a gate having a post, b, hinge bar, c, rest, d, hinges, e e1. ring, f, and set screw, g, arranged, combined, and operating for the purposes and in the manner substantially as herein described.

66,824.—WOOL-PACKING TABLE.—A. Franklin, Galena, Ohio.

1st, I claim the concave bed, D, applied at one end of the apron bed, B', and extending below the plane of this bed, substantially as described.

2d, Attaching one end of the slitted apron, F, to an adjustable bar, F', applied to the concave bed, D, substantially as and for the purposes described.

3d, The elastic strap, i, as applied over the baling cords, e, substantially as and for the purpose described.

4th, The combination of the three-pronged cord holders, E, with the concave bed, D, substantially as described.

5th, The application of spring latches, b', to the sides of the elevated portion of the concave bed, D, substantially as described.

6th, The combination of the lever, G, swinging arm, h, hook, g, and apron, F, substantially as described.

66,825.—WEIGHING SCALE.—L. H. Franklin, Poland, N. Y.

I claim the swing case, A, with indexes, in combination with the eccentric, b, the strap, a, and the lever, B, arranged and operating for weighing, substantially as herein described.

66,826.—FENCE.—George L. Gavett, Sandstone, Mich.

I claim the employment of diagonal tie braces, F, in combination with sills, C, and posts, D, for bracing and tying the panel rails of a farm fence, either with or without the pins, p, substantially in the manner herein specified.

66,827.—HARNESS MOTION FOR LOOMS.—John F. Gebhart, New Albany, N. Y.

I claim, 1st, The frame, F, with sheaves, G G G, for carrying the straps from the end of the loom to the heddle frames, when said frames are connected to the under part of the looms by the straps and pulleys, J J J, for the purpose specified.

2d, The combined worm cam, M, placed under the heddle frame, H, into which are placed the pins on the bars, P, for shifting the shafts, g g, with clutches, e e' in the manner and for the purpose set forth.

3d, The arrangement of the shaft, b, provided with sliding cams, D D, cog K, with the driving shaft, X, and its gear, and the treadles, E, for the purposes specified.

4th, The combination and arrangement of the frame, B, upon the end of the loom frame, A, for supporting the cam shaft and cam to operate the treadles, when said treadles are secured upon the stand, C, and connected to the straps which pass over the frame, F, and connect the heddle frames, H, with straps and pullies, J, in the manner and for the purposes set forth.

66,828.—HARNESS MOTION FOR LOOMS.—John T. Gebhart, New Albany, Ind.

I claim, 1st, The arrangement of the slides, F F F, and dogs, G, as constructed and used in combination with the levers, H H, and cam, D, for the purposes specified.

2d, The wheel, E, with lugs, g g, shaft, I spur wheel, n, cylinder, K, with pins, z z z, for operating the dogs, G, and giving motion to the slides, F, when constructed and operating in the manner and for the purposes set forth.

3d, The arrangement of the slides, F, sheaves, d d1 d2, and cords, e e, with the frames, A A', and bows, a a, as herein set forth.

66,829.—FARM GATE.—S. Goewey, Dormansville, N. Y.

I claim the combination of the horizontal bars, A connecting chains, D, or their equivalents, slotted posts, B, ropes or chains, G, and weights, I, with each other, substantially as herein shown and described and for the purpose set forth.

66,830.—MACHINERY FOR PROPELLING VESSELS.—Stephen J. Gold, Cornwall, Ct.

1st, Applying the power, to turn the paddle wheels, directly to the paddle wheels, at or near their peripheries, by means of gear cogs on said paddle wheels, which mesh into the cogs of a suitable pinion, which pinion is driven by the engine, substantially as herein-above set forth.

2d, Separating the rim of the pinion, I, from the miner portion, M, to which it is secured, and with which it turns by interposing between them india-rubber, or some other elastic non-resonant body, substantially as and for the purpose set forth.

3d, The combination with the gearing on the paddle wheels of the pipes, Q, substantially as and for the purpose specified.

4th, The combination with the pipes, Q and S, of the openings through the shaft, U, for supplying the said pipes, Q, with steam, substantially as and to the effect set forth.

5th, The combination of paddle wheels turned by means of cog gear on said paddle wheels at or near their peripheries, and suitable pinions operated by steam machinery, substantially in the manner set forth, with the hull of a vessel constructed with numerous transverse walls or bulkheads connected near the top thereof by a web, in such a manner that the said walls will sufficiently stiffen and strengthen the vessel without the use of ribs, substantially as herein-above described.

66,831.—WASHING MACHINE.—Wm. Goodman, Troy, Mich.

1st, I claim the combination of the exterior and interior semi-cylindrical tubs, B and D, with each other and with the frame, A, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the cylindrical rubber, E, and frame, F, with the interior tub, D, substantially as herein shown and described, and for the purpose set forth.

3d, Pivoting the exterior tub, B, the interior tub, D, and the rubber frame, F, to the frame, A, by the same pivoting rod, C, substantially as herein shown and described,

66,832.—GATE.—Burton Greenside, Fort Dodge, Iowa.

1st, I claim the combination and arrangement of the cogged or toothed plates, e1 e2, and the cap or plate, e3, having two curved grooves, e6, formed in the lower side to receive and guide the two guard pins, e5, attached to the plate, e1, with each other, substantially as herein shown and described and for the purpose set forth.

2d, The combination and arrangement of the adjustable latch, F, and weighted operating lever, G, with each other and with the front vertical bar of the gate, substantially as herein shown and described and for the durpose set forth.

3d, The combination of lever, H, with the weighted lever, G, and latch, F, and with the upper part of the gate, substantially as herein shown and described and for the purpose set forth.

4th, The combination of the adjusting screw, I, and nut, J, with the lower part of the weighted lever, G, and with the front vertical bar of the grate, substantially as herein shown and described, and for the purpose set forth.

5th, The combination of one or more movable latches, K, and pivoted drops L, with each other and with the post, B, substantially as herein shown and described and for the purpose set forth.

66,833.—PROCESS OF "HOPPING" BEER, ALE, ETC.—Wm. S. Haight, Waterford, N. Y.

1st, I claim the process, herein specified, of extracting hops by placing the same into an air-tight vessel and applying the beer, substantially in the manner herein specified.

2d, Applying steam to the hops when the same are contained in an air-tight vessel, preparatory to the application of the beer, substantially as set forth.

3d, The process, herein set forth, of removing the beer from the hops from which the extract has been taken by the application of water, as set forth.

66,834.—SCRUBBER AND MOP HOLDER.—John J. Harlan, Cincinnati, Ohio.

1st, I claim the holder, A, furnished with the T-slots, c c', substantially as described, in combination with the rod, B, and mop, M, in manner and for the purposes as herein set forth and described.

2d, The holder, A, furnished with the U-shaped groove, and the slots, f f', substantially as described, in combination with the rod, E, in manner and for the purposes herein set forth and described.

3d, Attaching the mop cloth, M, and scrubber, R, to the same holder at the same time, by the means and in manner and for the purposes, substantially as herein set forth and described.

66,835.—CLOTHES WRINGER.—Joshua Harrison, Brooklyn, N. Y., and Geo. H. Harris, Munson, N. Y.

1st, We claim the combination, in a clothes wringer, of a cork roll and a rubber roll, substantially as and for the purpose set forth.

2d, The combination with the cork roll, D, and rubber roll, C, in a clothe wringer, of the spring, F, and bar, E, substantially as set forth.

3d, The combination with the end pieces, A and B, forked at their lower ends, the rolls, C and D, and the spring, F, of the bent levers, H and I, the said bent levers being so constructed and arranged as to accomplish the result set forth, substantially as herein-above specified.

66,836.—CLOTHES WRINGER.—J. Harrison, Brooklyn, N. Y., and G H. Harris, New York City, assignors to themselves and Chas. W. Hudson, New York City.

I claim, 1st, The combination with the end pieces, D and E, and rolls, A and B, of the bar, F, and spring, G, substantially as set forth.

2d, The combination, in a clothes wringer with the bar, F, and spring, G, of a teat or projection, C, upon one which fits into a depression in the other, to hold said spring in its place, substantially as herein-above specified.

66,837.—KNIFE AND SCISSORS SHARPENER.—Augustus Herthal, Bridgeport, Ct.

I claim, 1st, The plates, B B, constructed as described, and adjusted by means of the set screws, a, between the jaws of the spring plate, A, provided with screw, d, as herein set forth for the purpose specified.

2d, The double plates, B B, in combination with the rollers, c c, set screw, a, and support, A, all made and operating substantially as and for the purposes herein specified and described.

66,838.—DEVICE FOR MAKING CENTERS FOR WATCH CASES.—B. Hilbert, New York City.

I claim, 1st, The mold for casting the "centers" of watch cases, when formed of the hinged jaws, A, in combination with the sectional ring, B, and case, C, all made and operating substantially as herein shown and described.

2d, The device for finishing and smoothing the outside of the centers consisting of the sliding and revolving shaft, D, in combination with the eccentric shaft, H, and cutters, I, all made and operating substantially as herein shown and described.

3d, The device for smoothing and finishing the inside of the centers con-

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sisting of the revolving cylinder, J, in combination with the eccentric sliding shatt, L, and cutters, N, all made and operating substantially as herein shown and described.

4th, The revolving shell or cylinder, J. made of two pieces hinged together and provided with grooves, l, around its inside and otherwise constructed, substantially as set forth.

66,839.—WASHING AND WRINGING MACHINE.—Israel Hogeland, Lafayette, Ind.

I claim the combination of the rollers, b b b, etc., and b' b' b', etc., with the endless apron, h, the gearing of the cog wheels, C* C' of the springs, d and thumb screws, c, together with the perforated or slotted pipes, l l l, etc. the apron, h, and rollers, g g, all operating substantially as set forth and described for the purpose.

66,840.—DEVICE FOR PREVENTING HORSES FROM BITING AND CRIB-BITING.—B. D. Howe, Hanover, N. H.

I claim a muzzle of suitable material constructed with bands of metal with an opening, a a' b b' c c', used in the manner and for the purpose set forth.

66,841.—APPARATUS FOR DISTILLING AND REFINING PETROLEUM.—C. G. Howell, Corning, N. H.

I claim distilling, refining and producing petroleum and other liquids by the direct action ofheat to the heating vessel, D, and by the action of steam on a retort in a steam boiler, substantially as shown and described.

66,842.—DISH HOLDER.—F. H. Hubbard, Ripon, Wis.

1st, I claim the combinatian and arrangement of the handle, I, and lever, P, provided with jaws, B B, enveloped with rubber bands, S S, and spiral spring, S, for keeping the jaws in position to secure the dish when used in the manner and for the purposes specified.

66,843.—DOOR SPRING.—Hugh Hughs, Utica, N. Y.

I claim the construction and arrangement of the door spring above set forth and described.

66,844.—LOOMS.—F. W. Hupelsburg, New York City.

1st, I claim the conical or taper take-up rollers, J K, constructed and arranged substantially as shown.

2d, I also claim the horizontal warp spool frame, A, in combination with the conical take-up rollers, J K, substantially as shown.

66,845.—MACHINE FOR PRESSING AND CUTTING THE FILLINGS FOR CIGARS.—W. H. Huse, Brooklyn, N. Y.

I claim, 1st, The treatment of the filling for cigars and plug tobacco by passing it through a steam jacket on its way to be compressed and cut substantially as described and for the purpose set forth.

2d, The combination of the steam jacket and endless apron with the compressing wheels and V-shaped cutters, substantially as described.

3d, The combination of the steam jacket and endless apron with the cutting and compressing wheels and straight cutters, substantially as described and for the purposes set forth.

4th, The combination of the steam jet with the cutting and compressing wheels as and for the purpose described.

5th, Cutting the compressed filling into the proper lengths for cigars and giving to one end of each length so cut the proper taper to form the tip when wrapped by means of the revolving V-shaped cutters, arranged substantially as herein described.

66,846.—HOPPLE.—G. W. Hyatt, Auburn, N. Y.

I claim, 1st, The combination of the bow, A, hook, C, and hasp, D, when all are arranged and operated substantially in the manner and for the purposes above set forth.

2d, The combination of the swivel joint, F, with the link, E, having one of its sides bended as and for the purpose substantially as above specified.

66,847.—OAR.—A. S. Jacobs, St. Louis, Mo.

I claim the construction and arrangement of the oar, A, pivoted at a, to the gunwale of the boat its inner end provided with ferrule, b, pivoted to the connecting rod, C, extended diagonally across said gunwale whose outer end is pivoted to the ferrule, d, at the outer end of the short lever, B, which is pivoted to the row locks, c, as herein set forth all operating independently of the oar on the opposite side of the boat as herein set forth for the purpose specified.

66,848.—RUBBER-COATED RUBBER BELTING.—Pliny Jewell, Jr. (assignor to P. Jewell & Sons, Hartford), Ct.

I claim a new article of manufacture a gum coated leather belt, substantially as and for the purpose described.

66,849.—SPRING FOR BED BOTTOMS.—James Johnson, Northampton Co., N. C.

I claim the arrangement and combination of the circular top, A, links, K, braces, B and C, with the vertical rod, D, and spring, E, operating in the tube, F, as herein described and for the purposes set forth.

66,850.—PRUNING SHEARS.—S. W. Jones, Bluffton, Ind.

I claim, 1st, The pruning shears above described having the fixed blade, A, attached to the staff, C, and operating in combination with the movable blade, A, the connecting rods e e, and the levers, D and H, substantially as and for the purpose described.

2d, The movable lever, D, pivoting in a sliding thimble, F, on the staff, C, and having the holes, m m m, by which its power may be adjusted substantially as and for the purpose specified.

66,851.—EXTENSION SLIDE FOR TABLES.—Charles Kean, Holidaysburg, Pa.

I claim the grooved centers, caps and bases put together in the manner and form set forth for the purpose specified.

66,852.—GATE.—Elijah Kemper, Thornville, O.

I claim the combination with a sliding gate of the tilting latch, I, constructed and operating as herein above set forth.

66,853.—MACHINE FOR GRINDING THE RUNNER OF SKATES.—Abraham Kipp, Jr. Sing Sing, N. Y.

1st, The combination with a grinding wheel or stone and loose holder to the work having a level bearing surface as described, a bed or table on which said holder rests and over which it is moved hinged or made adjustable to vary its angle relatively to a horizontal position, essentially as herein set forth.

2d, The loose or free holder, D, forming a base or bearing plane provided with adjustable clamps, E, and rests, H, for securing and supporting the work, all constructed and arranged substaatially as specified.

66,854.—CORRUGATED LIGHTNING RODS.—J. A. Kissell and N. Blickensderfer, Chicago, Ill.

We claim a lightning conductor consisting of a continuous flat strip, corrugated longitudinally as herein shown and described.

66,855.—EGG BEATER.—P. Klepper, Centralia, Ill.

I claim the arrangement of the beater, A, in combination with the stand, C, supported by legs, d, substantially as and for the purpose described.

66,856.—SCRUBBING UTENSIL.—B. I. Lane, Framington, Mass.

I claim a scrubbing brush or utensil the friction surface of which is composed of a caoutchouc or equivalent elastic material and abrasive powder combined together substantially as set forth,

I also claim forming the friction surface of a scrubbing brush or utensil of alternate rows of bars and teats or points of caoutchoue or equivalent elastic material or compound, substantially as shown and described.

I also claim forming the rubbing surfaces as projections from a rubber block, c, into which the handle block, a, is inserted substantially as shown and described.

66,857.—GLOBE VALVES FOR STEAM ENGINES.—Daniel Lee, Boston, Mass.

I claim the arrangement of the valve and the screw which moves it with relation to the diaphragm, stuffing box, and plug, l, substantially as and for the purpose described.

66,858.—BOX FOR INDELIBLE INK.—C. L. Lochman, Carlisle, Pa.

1st, I claim as a new article of manufacture a pasteboard box with wooden top and bottom constructed substantially as set forth.

2d, The use of an elastic band or stretcher made of any suitable material in connection with said box for the purpose specified.

66,859.—GRAIN SEPARATOR.—A. W. Lochhart, Sacramento, Cal.

1st, I claim adjustably attaching the fans to the fan shaft so that they may be set at any desired angle, substantially as herein shown and described.

2d, The combination of the fan boards, D, jointed arms, C C, and curved arms, E, or equivalent with each other and with the fan shaft, B, substantially as herein shown and described.

3d, The combination of the curved adjustable blast boards, I and J, with the air chamber, A, blast chamber, K, and with the shoe of the machine, substantially as herein shown and described and for the purpose set forth.

66,860.—DROP PRESS FOR PRESSING HAY AND OTHER PURPOSES.—Stephen Mahwin, Liberty, Ill.

I claim the revolving drum, K, provided on its periphery with a continuous groove, k, in combination with the stationary drum, H, lever, I, rope, G, pulleys, e e' weight, B, and frames, A E F, substantially as and for the purpose described.

66,861.—LAND ROLLER AND MARKER.—A. Mains, Alena, Ill.

I claim the levers, E, pivoted to the side of the frame, A, and having the rollers, F, pivoted to their lower ends constructed and arranged as described in such a manner that the roller, C, may be raised above or rest upon the surface of the ground as shown and for the purpose specified.

66,862.—GAS STOVE.—M. S. Marshall, Melrose, Mass.

I claim, 1st, The combination of the furnace, A, pins, B3, and gas stove, B, when said parts are respectively constructed and arranged to operate substantially as and for the purpose set forth.

2d, The vertical pipe, D, when constructed with gratings, D2, formed by outwardly projecting rods and filled by pieces of soapstone or other suitable conducting and refracting material, substantially as and for the purposes set forth.

3d, The pipe, G, when constructed with internal pipes opening and projecting into the chamber of the stove, substantially as and for the purpose set forth.

4th, In combination with the vertical pipes, D E F G, all or any of them, I claim the double top-plate, K and L, arranged substantially as and for the purpose set forth.

5th, In combination with the stove plates B, I claim the gas pipe and burner, C, and flue plate, H, when arranged substantially as and for the purpose set forth.

66,863.—MOP HEAD.—H. H. Mason, and Joseph Messinger, Springfield, Vt.

We claim a mop head of the kind specified, having the ends of the wire or rod which constitute the movable jaw E, secured to the lugs or ears of the nut D, by inserting the ends of said wire or rod in the mold in which the nut is cast so that the lugs or ears will be cast around the ends of the wire or rod substantially as shown and described.

66,864.—DEVICE FOR CRIMPING BOOTS AND SHOES.—J. W. Maxfield, Potsdam, N. Y.

I claim the arrangement of the knite, d, and awl, e, with clamp, a, attached to the lower part of pincers for the purpose specified.

66,865.—HORSE RAKE.—Wm. H. McPherson, Danby, N. Y.

1st, I claim the oval revolving head, A, provided with the groove or grooves, O, the rod for holding the teeth and the pressure staples, Q, as described.

2d, The combination of the lever, F, made as described, the spring, R, and the stop plate, L, substantially as and for the purposes described.

3d, The wheels, B C D, and lever, E, all constructed and arranged substantially as described.

66,866.—WAGON BRAKE.—B. B. Monroe, Jackson, Mich.

I claim the slotted blocks, F F, connected to the bars, E, by the bails, a a, when arranged with the bar, H, and rod, G, and operating in the manner substantially as and for the purposes specified.

66,867.—FLOUR BOX.—Frederick Monroe, Charlestown, Mass.

I claim a flour box having its cover made substantially as and for the purposes described.

66,868.—MUCILAGE STAND.—E. Morgan, Springfield, Mass.

I claim a reservoir mucilage stand having a fountain which connects with and supplies the well, substantially as herein described, in combination with a brush.

66,869.—HARROW.—John E. Morgan, Deerfield, N. Y.

I claim the construction and use of the sectional harrow with inclined coupling links as described, and for the purposes described.

66,870.—GATE.—Theodore Munger, Cedar Falls, Iowa.

1st, I claim supporting the gate by its longitudinal rails upon two flanged rollers, C C, the said rails having their contact edges chamfered or beveled whereby the gate is made capable of being adjusted in hight as described.

2d, The self-closing catch in combination with the oblique ended slat.

66,871.—CULTIVATOR.—John Murphy, Albany, Ga.

1st, I claim the construction of the frame, A B and C, in combination with the plow beams, F, secured thereto substantially as and for the purpose described.

2d, I also claim the plow, S, with its arm, Q, substantially as and for the purpose specified.

66,872.—COCKLE AND GARLIC SEPARATOR.—J. W. Neal, Big Lick, Va.

1st, I claim the spindle, C, with the perforated metal plate, t, and corrugated bar I, when constructed and used substantially as herein specified.

2d, The combination and arrangement of the frame A, and hopper B, cylinder, C, as constructed, brush, D, board, E, and drawer F, all operating in the manner and for the purposes specified.

66,873.—DOOR SPRING.—J. W. Newton, Norwich, Conn.

I claim the combination of the curved bed piece, B, shaft, F, rod, I, spiral or other suitable spring, Q, and arm, P, attached to the door when all combined and arranged together substantially in the manner and for the purpose described.

66,874.—CALL BELL.—W. H. Nichols, (assignor to J. H. Abell,) East Hampton, Conn.

I claim the application to gong or call bells of a twisted rod, b, for the purpose of revolving the clapper, D, substantially as herein shown as described.

The combination with each other of the tube, B, bell, C, clapper, D, twisted rod, b, and spring, e, all made and operating substantially as and for the purposes herein shown and described.

66,875.—WHEEL-WRIGHT'S MACHINE FOR TENONING SPOKES.—G. H. Ober, Newbury, Ohio.

I claim arranging two cutters upon a frame in such manner that they can be adjusted to cut tenons of different thicknesses when used in combination with an adjustable table, G, and clamp, P, all constructed to operate substantially as described.

66,876.—APPARATUS FOR ENVELOPE MACHINES.—E. B. Olmsted, Washington. D. C.

1st, I claim the vertical box, D, containing the inclined shelf, N, and the gumming box, E, and roller, e, and supporting and guiding the plunging plate, O, substantially as and for the purpose described.

2d, The horizontal box, B, containing the plunger, C, the stops, b b, the springs, b" b", and the hinged plates, M and M', substantially as and for the purpose specified.

3d, The sliding box, L, moving on the end of the box, B, and having the arms, l" l", the slot, l', and the interior barbed arms, t t, substantially as and for the purpose described.

4th, The apparatus for moving, cutting and gumming the binding tape, cousisting of the shaft, G, with the drum, g', and ratchet wheel, g, the tube, H, the knife, I, and the ratchet wheel K, bearing the cam, k, all arranged and combined substantially as and for the purpose described.

5th, The plunger. C, consisting of two parts, C' and C", and the spring c, and having a face composed of two vertical plates and a wide space between them, substantially as and for the purpose specified.

6th, The rod R, having the clutch at its extremity in combination with the guide, l, and the slot, l', in the wall of the box, L, substantially as and for the purpose described.

66,877.—CUTTING AND GUMMING APPARATUS FOR ENVELOPE MACHINES.—E. B. Olmsted, Washington, D. C.

1st, I claim the channel, B, having cutting edges acting in combination with the knife, I, substantially as and for the purpose specified.

2d, The cutting and gumming instrument, D, having the movable plates, L L, with gumming beds, l' l', the knife, I, and the metallic paper-holding strip, K, substantially as and for the purpose specified.

3d, The combination of the plunger, E, the cutting and gumming instrument, D, and the table, A, substantially as and for the purpose described.

66,878.—FOLDING AND PRINTING BED FOR ENVELOPE MACHINES.—E. B. Olmsted, Washington, D. C.

I claim a triple bed, H, composed of the plates, h h' h", connected as shown supported and guided by the shaft. B. and actuated by the arm, G', substantially as and for the purpose described.

66,879.—DROP HAMMER.—L. H. Olmsted, Stamford, Conn.

I claim the combination of the friction driving pulley, I, and shaft, D. with the devices for engaging and disengaging the one from the other, consisting of the weight, F, the upright shaft, J, provided with the arms, L L', the bar, K, attached to an arm, n, on the upper end of said shaft and the sliding collar, m, on the shaft, D, all arranged to operate in connection with a friction clutch pulley substantially as set forth.

I further claim the ratchet, G, and pawl, H, in combination with the mechanism et forth in the first clause of claim, substantially as and for the purpose described.

66,880.—HAT BOX.—Charles W. Packer, Philadelphia, Pa.

1st, I claim a box, A, having a vertical opening, x, and a leaf, b, a central standard, C, and lid, B, all being constructed and arranged substantially as and for the purpose herein set forth.

2d, The combination of a box constructed as above described and a standard or pillar, C, made hollow and furnished with a cover as and for the purpose described.

66,881.—FOLDING LUNCH BOX.—Franklin B. Parks, Cambridgeport, Mass.

I claim the arrangement of the flanges of the box, bottom, sides and ends with such bottom, sides and ends connected in manner and so as to be capable of being folded together. as explained, each end plate under such an arrangement being hinged on one of the side plates.

I also claim the arrangement of the flanges of the box top, with the said top, and with the bottom, sides and ends connected together in manner, as so as to be capable of being folded together as described.

I also claim the arrangement of the hooks, and their receiving holes with the top, the bottom, sides and ends of the box, connected in manner and so as to be capable of being folded together as set forth.

I also claim the combination of the recesses of the sides with the bottom, sides and ends, connected substantiallyi n manner and so as to be capable of being folded together as explained.

66,882.—WAGON BOX.—D. H. Peterson, Terre Haute, Ill.

I claim the grooved and flanged irons, G and H, in combination with the end and side boards C and B, of the wagon box, substantially as herein shown and described and for the purpose set forth.

2d, The irons, F and E, constructed substantially as herein shown and described, in combination with the side boards, B, and bottom bars, D, of the wagon box, as and for the purpose set forth.

66,883.—BED LOUNGE.—James D. Pratt, Cleveland, Ohio.

1st, I claim the hollow safe or drum-head receptacle, D, provided with the sunk depression or recess, C, and lid, F', inclined folding head, G, provided with the sunk depression or recess, H', drop leg, L, and flap, N, all combined, arranged, and operating in combination with the permanent head and folding seat of the lounge, substantially as and for the purposes herein set forth

2d, The employment and use of the springs, C1 and C2, located over the openings, B B1, of the frames, A and A', and operating as and for the purpose specified.

66,884.—DROP PRESS.—J C. Rhodes, South Abington, Mass.

I claim the drop, C, provided with a ratchet bar, a, and with a projecting stud, b, in combination with the double-armed pawl, c, and spring, d, all made and operating substantially as herein shown and described.

66,885.—WOOD-TURNING LATHES.—John Richards (assignor to J. A. Fay & Co.), Cincinnati, Ohio.

1st, I claim the combination of a tubular tail stock with a rack and pinion for moving the same, arranged and operating in the manner and for the purposes specified.

2d, I claim the recess or rectangular extension of the bow in the tail stock shown at a, formed in the manner and for the purposes explained.

66,886.—STOP MOTION FOR WARPING MACHINES.—L. V. Richmond, Brainard, N. Y.

1st, I claim the construction and arrangement in the sliding box, G, of the cylinder, H, with flanges, h', upon which the hooks, i, rest in such a manner that their eyes shall be above the upper plate of the said box whereby the threads are easily adjusted, as herein shown and described.

2d, I claim the sliding box, G, provided with the flanged shaft, H, having the fixed clutch, K, and sliding cogged clutch, l l', in combination with the pinion, m, horizontal shaft, m', and pulley, o', arranged and operated by means of the band, o, from the shaft, B, substantially as and for the purpose herein shown and described.

3d, I claim the stationary box, G', with its appendages consisting of the flanged cylinder, H, sliding clutch, l, having arm, z*, sliding plate, z', springs, z" and r, latch, s, horizontal sliding bar, t having staple, w, and spring, n, operated from shaft, X, by means of the cord, o, substantially as herein set forth.

4th, I claim the plate, R, for sustaining the drop wires, i, and operating substantially as herein shown and described.

5th, I claim the cord, n, for the purposes of transferring the motion from the forked sliding bar, m", to the spring, r, substantially as herein shown and described.

6th, I claim the combination of the forked bar, m", with the pins, q q, and cord, n, substantially as and for the purpose herein shown and described.

66,887.—WELL TUBING.—Lewis F. Rider and John W. Ferry, Hornellsville, N. Y.

We claim the point, A, as constructed with its projecting cutting edges, a a, on the underside combined with the lower end of the tube, C, with its steel pin, d, to hold the barrel or shield, D, on the outside of the pipe while being driven, substantially as herein described for the purposes set forth.

66,888.—PISTON PACKING.—George Robinson, Detroit, Mich.

I claim the packing ring, D, constructed as described in combination with the rings, E and F, arranged so as to close the holes, a a', alternately to the steam passing beneath the ring, D, pressing it out, as herein set forth for the purpose specified.

66,889.—CHERRY STONER.—O. L. Robinson, Owasso, Mich.

1st, I claim driving the stones at once out of a number of cherries by means of a series of punches, m, which are made to pass through the cherries, the latter being placed upon a plate, D, which is provided with perforated countersinks, substantially as and for the purpose herein shown and described.

2d, The plates, D and E, when made as described in combination with the frame, A, and lever, C, all made and operating substantially as herein shown and described.

66,890.—WATCH.—Henry Rothfelder, New York City. Antedated June 11. 1867.

I claim fitting a watch key in the handle of a watch case and retaining it therein by a suitable catch or fastening, substantially as described so that said key is not liable to drop out spontaneously but can be taken out and used like an ordinary watch key.

2d, The sleeve, d, in combination with the key, C, handle, B, and spring, f, substantially as and for the purpose set forth.

66,891.—PEA RAKE.—Emery W. Rowley, Jr., Antwerp, N. Y.

I claim providing a pea rake with a serrated or toothed cutter, D, substantially in the manner and for the purpose herein shown and described.

66,892.—CLIP FOR CLOTHES LINES AND OTHER PURPOSES.—Julien S. Rowley, Chateangay, N. Y.

I claim the improved clip for clothes lines formed of the side clamps, B B, riveted to the center piece, A, arranged and operating as herein described.

66,893.—HINGE.—Samuel Selden and W. J. F. Liddell (assignors to John C. Selden), Erie, Pa.

We claim the stop in the band of the loose-jointed reversible door hinge constructed as specified and for the purposes set forth.

66,894.—HORSE RAKE.—D. P. Sharp, Ithaca, N. Y.

1st, I claim the spurs, e, arranged upon the bar, C, in combination with the rake teeth, B', and clearing spurs, i, on the bar, F, operating substantially as herein set forth for the purpose specified.

2d, The lever, D, rod, g, and spurred bar, C, arranged in relation with each other and with the spurred bars, F, bars, E', and standards, E, substantially as herein set forth for the purpose specified.

66,895.—COTTON PLOW OR CULTIVATOR.—F. Marion Shields, Macon, Miss.

1st, I claim the hoes, D d d', when constructed in the manner and for the purpose herein described and represented.

2d, The combination of the hoes, D D D, beam, A, shanks or stocks, E E, draft tongue or beam, B, and handles, C C, all arranged substantially in the manner and for the purpose set forth.

3d, In combination with the above the fenders, F F, applied in the manner and for the purpose set forth.

66,896.—WIRE-TWISTING MACHINES.—C. Shortan (assignor to T. W. Bracker), New York City.

I claim the construction and arrangement of the slotted standards, D, and standards, G, upon the bed piece. B. slotted pinions, H, sector-shaped gear wheels, I, attached to the rock shaft, J, hung in bearings, K. crank arms, L P spring, O, wire, M, and treadle, N, substantially as described for the purpose specified.

66,897.—METHOD OF MANUFACTURING CARMINE.—Gustav A. Siegle, Brooklyn, N. Y.

I claim, 1st, Treating cochineal with water, bicarbonate of ammonia, alum, cream of tartar, acetic acid, egg and spirits of wine for the purpose of extracting pure carmine, substantially as herein set forth.

2d, Treating cochineal with water, crystallized soda, alum, cream of tartar and spirits of wine, substantially in the manner herein set forth for the purpose of extracting pure carmine.

3d, Treating the carmine contained in the liquor which is drawn off, the pure carmine, with tartaric acid, substantially as and for the purposes herein shown and described.

4th, Treating the refuse cochineal from the first and second process above described with soda and boiling it, substantially as set forth for the purpose of producing liquid lake.

5th, Heating the refuse cochineal from the fourth process and treating it with soda and prussian blue. for the purpose of producing a violet color.

6th, Heating the refuse cochineal from the fourth process and treating it with soda, starch and alum, for the purpose of producing a purple color.

7th, Treating the refuse cochineal from the fifth and sixth processes by placing it below the surface of the earth in a well-covered box, substantially as and for the purpose herein specified.

66,898.—TICKET HOLDER.—Samuel A. Simison, Earlville, Ill.

I claim a ticket holder, made substantially as described for the purpose specified.

66,899.—BOOK-SEWING MACHINE.—Ferdinand Sims, Galveston, Texas.

1st, I claim a machine for sewing books, made and operating substantially as herein shown and described.

2d, I claim the manner of preparing the sections of paper with notches, slots and slits at the ends, etc., substantially in the manner and for the purpose herein shown and described and the use of sections prepared.

3d, I claim the combination of the cross head, b2, screw, b', and board, b, with the tablet, B, for the purpose of forming a press or clamp, operating substantially as herein shown and described.

4th, I claim the needle bar, D, and its combination with the eccentric, d2, plate, d3, and needle holders, f, all made and operating substantially as herein shown and described.

5th, I claim the slotted needle holders, f. and springs, f2, constructed and operating substantially as herein shown and described.

6th, I claim the pedal arrangement, E, when combined with the levers, e, and needle bar, D, substantially in the manner and for the purpose herein shown and described.

7th, I claim the slotted guide plates, h, made and operating substantially as herein shown and described.

8th, I claim the application of the cords, i, and the manner of holding the same in place, substantially as and for the purpose herein shown and described.

9th, I claim the slotted key plate, l, made and operating substantially as herein shown and described.

10th, I claim the needles, G g g1 and g2, made and employed and operating substantially in the manner herein shown and described.

11th, I claim the needles, g3 and g4, when applied for the purpose herein shown and described.

66,900.—BRIDGE.—R. W. Smith, Tippecanoe, Ohio.

1st, I claim a bridge constructed with inclined posts, C C, in combination with the braces, D D, resting squarely against the sides of the posts and arranged in relation to the sills and chords substantially as described.

2d, In combination with the inclined posts and braces as described, I claim the vertical central posts. C2, and braces. D1, substantially as described.

66,901.—CHURN.—Myron H. Spaulding, Morrisville, Vt.

I claim the construction of the plates, C and E, forming a metallic box containing changeable gearing, G and K, waen arranged and combined with double beaters, as herein described and for the purposes set forth.

66,902.—LANTERN.—Charles F. Spencer, Rochester, N. Y., assignor to himself and Charles W. Barker, Irondequoit, N. Y.

I claim the arrangement herein describee for fastening the cap to the guards, consisting of the bearings, b, formed by bending projections of the guard wires concentric with the guard ring, in combination with the eyes, g, on the under side of the cap for sliding over the bearings, and the flange, f, or equivalent, for centering the cap, the whole operating substantially in the manner and for the purpose herein set forth.

66,903.—STAIR ROD.—Charles E. Stearns, Boston, Mass.

I claim the combination and arrangement of the hook and eye and the double tapering spring bar provided with shoulders and studs, as set forth.

66,904.—COMBINED PLANTER, HARROW, AND CULTIVATOR.—D. D. Steele (assignor to himself and T. E. McDonald), New Brunswick, N. J.

1st, I claim the corn dropper and mode of cutting off the required amount of grain to be dropped, substantially as described.

2d, I claim the revolving harrow made and operating in combination with the stationary harrow, in the manner and for the purpose substantially as described.

3d, I also claim the revolving hoes, set in similar manner, to be used in place of the harrow when required as a cultivator.

66,905.—MACHINE FOR ROLLING HOES.—Wm. T. Stillman, Ilion, N. Y.

1st, I claim a stand or frame with horizontal ways for the carriage that carries the rollers, and perpendicular ways for the anvil block, and a bed for the screw that raises the anvil block, the whole being constructed and arranged substantially as described.

2d, In combination with the subject matter of the first claim, I claim, the carriage, J, with one or more rollers and the vertical adjustable anvil, E, substantially as and for the purposes set forth.

66,906.—MACHINE FOR MAKING SPIKES.—Antoine St. Louis, Keeseville, N. Y.

1st, I claim the arrangement of the moving anvils, K and L, the slide hammers, H H', with its hammers, E and F, the latter being provided with a roller face, as and for the purpose set forth.

2d, the combination of the slide, W', and gripper, W, with the ways, V V, lever, U, and cam wheel, S, substantially as and for the purpose set forth.

3d, The combination of the knife or cutter, a, with the anvil, K, and hammers, E and H, substantially as represented.

66,907.—COAL STOVE.—John H. Stone, Philadelphia, Pa.

I claim the extended flange, e', of the fuel pot, E, in combination with the tubes, L L L L, retort, K, and air spaces, G and H, communicating with the external air through the base, A B, the said parts being arranged to operate together as described for the purpose of supplying and heating fresh air for the combustion of the inflammable gases arising from the burning fuel in the fuel pot, E.

I also claim, in combination with the retort, K, having tubes, L, connecting with hot-air space, G, around the fire pot, the cylinder, M, and the escape pipe, o, arranged within the upper part of the body, C D, of the stove, substantially in the manner described, for the purpose of diffusing the heat more effectually over the said body of the stove, and also for increasing the draft of the latter, as specified.

66,908.—SCREW PLATE.—George C. Sweet (assignor to himself and Frank Douglas), Norwich, Conn.

I claim a screw plate made in two parts, and pivoted together by pivots, A A, for the purpose of tilting one half of the plate down for the removal or reception of dies, as herein specified.

66,909.—PASTRY ROLLER.—Albert L. Taylor, Springfield, Vt.

I claim an implement for rolling pastry, composed of a plurality of rollers fitted in suitable end pieces or bearings, or any proper stock, substantially as shown and described.

66,910.—COMBINED CORN PLANTER AND CULTIVATOR.—S. J. Taylor, Rome, N. Y.

1st, I claim the vertical slide, K, operated by the spring, L, substantially as and for the purpose specified.

2d, The covering teeth, d d, having faces inclined inward and backward, and attached to the cross beam, D, substantially as and for the purpose described.

3d, The hinge by which the wings, C C', and the cultivator bars, O O', are jointed to the plow, A, composed of the jaws, m m, clasping the bolts, n n, substantially as and for the purpose specified.

4th, The combination and arrangement of the plow, A, the draw beam, B, the seed box, P, together with the wheel, G, for operating it, the wings, C C', the cross beam, D, having its covering teeth, d d, the adjusting bars, E E', and the cultivator bars, O O', all constructed and operated substantially as and for the purpose specified.

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66,911.—Steak Broiler.—D. C. Teller, Terre Haute, Ind.

I claim the vertical position in which the steaks are placed over the fire, and the arrangement of the vertical rods, E E, all substantially inclosed with the can, C, as specified, for the purposes in the specification.

66,912.—Corn and Cotton Seed Planter.—M. L. and R. W. Thornton, Lumpkin, Ga.

1st, We claim the combination of the corn and guano hoppers, J and L, dropping cylinders, I and K, shaft, G, guide spout, O, gear wheels, E and F, drive wheel, C, and shaft, D, with each other and with the frame, A, of the machine, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the cotton-seed hopper, M, and stirrer, N, with the guano or plaster hopper, J, dropping cylinder, I, shaft, G, spout, O, gear wheels, E and F, drive wheel, C, shaft, D, and frame, A, of the machine, substantially as herein shown and described and for the purpose set forth.

66,913.—Breech-loading Fire-Arm.—D. C. Thrasher and B. F. Aiken, Freetown, Mass.

We claim the bar, D, the tube, E (with its slot), and the guide wing, a, the spring catch, F, and the steady pin, H, in combination with the breech piece and barrel of a breech-loading gun, substantially as herein shown and described.

66,914.—Locomotive Truck.—J. E. and Wm. P. Tynan, Paterson, N. J.

We claim the elliptical-winged rollers, E E, the beam, A, the socket plate, B, the pivot plate, C, and bolt, D, when combined together as and for the purposes shown and specified.

66,915.—Window Shade.—Michael Vetter (assignor to himself and Simon Kahn), Muscatine, Iowa.

I claim a window shade which is composed of straws woven together, in the manner described, as a new and improved article of manufacture.

66,916.—Meat Chopper.—W. H. H. Walker, Bangor, Me.

1st, I claim the chopping knife as constructed with frame or bone, B, crank, c, wheels, d and f, pitman, D, and knife, E, and arranged to conrect with the table by means of clamp, A, or its equivalent, all constructed and arranged as and for the purposes specified.

2d, Pivoting the frame or bow, B, whereby a swinging motion may be imparted to the cutting blade, as described.

3d, The adjustable raising and lowering of the cutting blade by means and in manner substantially as described and shown.

66,917.—Wagon Brake.—Seth Warren, Hollis, Me.

1st, I claim the combination, as described, arrangement of the sliding frame, i i, with the rocker, c, the pieces, i i, working through the holes in the cross bar, e, and having the brakes with the crank shaft, o, all operating as and for the specified purposes.

2d, The combination and arrangement of the two cross pieces, e and f, united by the rods, h h, upon which moves the rocker, c, as and for the purposes set forth.

3d, The brake when so arranged by means of the crank, o, as to press against the wheel when the carriage has a forward motion and to be thrown up, and thus relieve the wheels in backing, in the manner and for the purposes herein set forth and described.

66,918.—Drying Boxes, etc., of Pulp.—Seth Wheeler and Edgar Jerome, Albany, N. Y.

We claim drying the hollow articles made directly from the paper pulp or other analogous substance, upon or within a frame which is rigid vertically but expansible horizontally, such frame being the one upon or within which the articles are made.

66,919.—Finishing Boxes, etc., of Pulp.—Seth Wheeler and Edgar Jerome, Albany, N. Y.

We claim pressing or finishing the article upon or within a removable permeable rigid frame such frame being the one upon or within which the article is made.

Sustaining the hollow article by a permeable rigid frame during the pressing or finishing process.

66,920.—Making Blanks for Paper Boxes.—Seth Wheeler and Edgar Jerome, Albany, N. Y.

1st, We claim creasing the paper blanks in their manufacture for the purpose described.

2d, Forming paper or paper board during the process of manufacture from pulp direct, with spaces at those points where, in the manufacture of many-sided hollow articles, no material is required, substantially as described and shown.

3d, As a new article of manufacture, paper or paper board made direct from pulp with creases on its surface and with spaces left in it at the points where, in the formation of many-sided hollow articles, no material is required, substantially as described and shown.

66,921.—Dust Room in Cleaning Cotton.—James Whitehill, Newburgh, N. Y.

1st, I claim the combination with a screen to the dust room of a brush operating in its one stroke or action to abruptly and rapidly travel over or sweep the face of said screen while in its opposite or further action it moves at a slower velocity over the same, substantially as and for the purposes specified.

2d, The winding pulley, G, with its tripping formation, c, in combination with the brush and rope or chain, operating essentially as herein set forth for the purpose specified.

3d, In combination with the screen and brush, operating as described, a cushion or springs to arrest the brush in its descent, substantially as specified.

4th, The attachment to the rope, F, when tripped, as described, of a swivel thereto, for operation in an intermediate manner between the winding pulley and brush, essentially as and for the purpose described.

66,922.—Car Coupling.—O. J. Whitney, Clifton Springs, N. Y.

I claim constructing the draw head of a railway car with a recess, E, in front of the hole through which the pin passes, and with an elevation, C, to sustain the pin, B, in an inclined position above the chamber into which the link enters, said draw-head being arranged to operate in connection with the ordinary pin, B, substantially as set forth.

66,923.—Corn Planter.—B. Wieland, Orangeville, Ill.

I claim the combination of the movable hopper, D, provided with the rotary disk, c, the guide bars, g g, the brushes, i, and the wire guides, m, the marking wheel, E, the discharge tube, G, and the covering wings, n n, arranged and operating substantially as and for the purpose herein described.

66,924.—Cotton Seed Planter.—Luther F. Wilcox and William G. Caldwell, Three Rivers, Mich.

1st, I claim the adjustable or extension teeth, i, arranged within the case, J, and operated by means of the inclines, J, on the adjustable box, K, and the springs, K, within the case, all arranged substantially as and for the purpose set forth.

2d, The rotating arm, M, within the seed hopper, I, arranged substantially as and for the purpose specified.

66,925.—Fruit Box.—William R. Wilcox (assignor to himself and William W. Wilcox), St. Joseph, Mich.

1st, I claim securing and supporting the cords of the box by means of the bent end, b, fitting into the slot, c, and the tenon, d, fitting into the slot in the corner of the box, substantially as herein shown and described for the purpose specified.

2d, In combination with the above, I claim the bottom, C, substantially as herein shown and described.

66,926.—Snow Plow.—Daniel L. Winsor, Cambridge, Mass.

1st. I claim the combination of the gage runners, B B, with the plow body, provided with the cutting and plowing nose, as specified.

2d, I also claim the arrangement of the bottom or the nose of the plow body with respect to the rest of the bottom surface of the body, and with the two guide runners, in manner substantially as specified.

3d, I also claim the arrangement of the cavity, d, and the seat, e, within the body of the plow, as explained.

66,927.—Door Spring and Hinge.—A. Wiswall, N. Y. City.

I claim the spiral spring, h, fitted on the upright rod, g, of the part, C, of the device, in combination with the oblique bar, b, of the part, B, of the device, pivoted to the bar, d, of the part, C, and provided at its outer end with a friction roller, E, against which the lower end, j, of the spring, h, bears, while the upper end, i, of said spring bears against the bar, c, of the part, C, substantially as and for the purpose set forth.

66,928.—Composition Finger Keys for Pianofortes.—Leopold Wolf (assignor to himself, K. S. Hathaway, and James Hamilton), West Meriden, Conn.

1st, I claim, as a new article of manufacture, composition finger keys for pianofortes.

2d, I claim the process of forming finger keys for pianofortes in metallic molds.

3d, I claim a composition for finger keys for pianofortes, substantially as described.

66,929.—Vent Plug.—Oramel N. Wood, Windsor, Vt., assignor to D. M. Smith, H. H. Mason, and A. C. Mason, Springfield, Vt.

I claim the tube, A, provided with the external screw threads, a a, and the cap, B, provided with a packing, f, and an internal screw thread to fit on the upper screw thread, c, and having grooves or air passages, e, made in it, all arranged substantially as and for the purpose set forth.

66,930.—Railway Chair.—L. M. Woodcock, Auburn, N. Y.

I claim the main chair, b, in combination with the auxiliary chair, c, constructed and used substantially as and for the purpose set forth and described.

66,931.—Tool for Threading Screws.—S. W. Young, and J. W. Hoard, Providence, R. I.

We claim a longitudinally-ribbed cutting tool of cylindrical or other suitable form, the end of which is beveled or recessed, so as to form the extremities of the said longitudinal rib or blades into cutting points, in the manner herein shown and specified.

66,932.—Steam and Water Joints.—Wm. Young, Easton, Pa.

1st. I claim the cavity or recess, E, between the fitting and the nut, D, substantially as and for the purpose set forth, in combination with the pipe, A B.

2d, I claim the nut, D, in combination with the socket or fitting, C, and the recess, E, substantially as shown and described for the purposes specified.

66,933.—Automatic Life-preserving Boat.—And. Carson, Memphis, Tenn.

1st, I claim constructing vessels with cabins, etc., constructed separate from the hull or framework of the vessel, and made detachable by devices operated automatically by the ingress of water into the body of the vessel, substantially as specified.

2d, In combination with the float, A, the arms, D, and latches, H, or their equivalents for the purpose set forth.

Reissues.

2,679.—Mode of Cleaning and Purifying Bone Black.—Charles N. Brock, Philadelphia, Pa. Patented July 2, 1861.

1st, I claim cleaning and purifying bone black by the application of a current of air, substantially as herein described.

2d. The combination of the perforated receiving vessel A, and diaphragm or screen E, with the supply pipe or vessel D, the air pipe B, and fan C, substantially in the manner and for the purpose herein shown and described.

3d, The screen F, in combination with the receiving vessel A, for separating and removing the fine dust from bone black by means of a current of air, substantially as herein described.

2,680.—Locomotive Head Light.—J. Carton, Utica, N. Y., assignee of John Stuber. Patented May 20, 1856.

1st, I claim in a lamp having a cylindrical wick the outer cylinder M, in combination with the button P.

2d. In a lamp having a cylindrical wick the outer cylinder M, and button P, in combination with the can or deflector N.

3d, In a lamp having a cylindrical wick the outer cylinder M, and deflector N, in combination with the chimney gallery O.

2,681.—Corn and Cotton Seed Planter.—C. C. Garrett, Dayton, Ala. Patented March 12, 1867.

1st, I claim the stirrup lever, R, connected to the side plates, A*, so that they may be raised and lowered, substantially as and for the purposes herein described.

2d, I claim the stirrup lever, R, and its connections with the side plates, A*, in combination with the lever, O, for the purposes and substantially as described.

3d, I also claim the harrow, C2, and its means of attachment to the springs, D2 D2, in connections with the seed planter, when constructed in the manner and for the purposes substantially as described.

4th, The box, K, provided with the slide valve, L, operated by the pintles, 1, in the gear wheel, E, and the levers, M N, all arranged substantially as set forth.

5th, The seed hopper, e, and cylinder, b, when applied to and used in connection with a cotton seed planter, substantially as and for the purpose specified.

6th, The attaching of the bearer springs, D2, to the frame of the device, in the manner described, or in any equivalent way to admit of the adjustment of said springs, substantially as and for the purpose set forth.

2,682.—Spoons and Forks.—Florain Grosjean, New York City. Patented Jan. 28, 1862. Reissued July 7, 1863. Again reissued July 12, 1864.

I claim a sheet-metal handle, having a central corrugation or hollow ridge which extends along the narrow part of the said handle and vanishes into the broad portion or palm thereof by tapering sidewise and flatwise, substantially as before set forth.

I also claim a sheet-metal handle having a central corrugation or hollow ridge which extends along the narrow part of the handle add vanishes into the bowl (or its substitute) by tapering sidewise and flatwise, substantially as before set forth.

I also claim a sheet-metal handle having two lateral hollow beads or corrugations which extend with a space between them longitudinally along the narrow part of the handle into the palm thereof, substantially as before set forth.

I also claim a sheet-metal handle having the central hollow ridge combined with the lateral hollow beads, substantially as before set forth.

2,683.—Cultivator.—D. J. Noble, New Boston, Ill. Patented March 20, 1866.

1st, I claim the combination of the adjustable plow beams, E, with a stationary frame, A, and a device whereby said beams may be locked rigidly at any desired hight, substantially as and for the purposes specified.

2d, I claim the levers, H H, pivoted to the frame, A, and arranged relatively with the plow frame, E, as herein specified, in combination with the notched plates, I I when all are constructed and operate substantially as and for the purposes set forth.

2,684.—Composition for Roofing and for other Purposes.—William L. Potter, Newark, N. J. Patented Feb. 21, 1865.

I claim the use of the above-described rock, as and for the purposes specified.

2,685.—Creasing, Slicking and Skiving Leather.—C. C. Bellows, New Ipswich, N. H. Patented Oct. 23, 1866.

1st, I claim the combination of the slotted standards, B, slotted triple-armed lever, E, springs, I, and rods, G, arranged to operate with the roller, D, when constructed and applied in the manner and for the purpose specified.

2d, The plate, J, having skiving knives, d, attached to or formed on it and applied to the upper roller, C, by means of the bars or clamp frame, substantially as and for the purpose described.

3d, The lateral adjustable creasing wheel, F, on the upper roller shaft operating with the flanged roller, G, substantially for the purposes specified.

4th, The combination and arrangement of two rollers of equal or unequal diameter and connected by gears of equal or unequal diameter with the creasing wheel, F, and flanged roller, G, substantially as and for the purposes set forth.

2,686.—Oiler.—John Broughton, New York City. Patented March 6, 1866.

1st, I claim an oiler having a rigid exterior inclosing or containing an auxiliary yielding or spring bottom, which is compressed or operated through a suitable opening in the said rigid exterior, substantially as set forth.

2d, Combining with the yielding or spring bottom of an oiler a rigid or inflexible exterior whose lower part is rounded or made to approximate in shape to a semi-sphere to form a rolling surface and is provided with an opening through which the yielding or spring bottom can be operated, substantially as set forth.

3d, The combination in an oiler of a rigid exterior, an internal yielding or spring bottom, and a compressing thumb piece, substantially as set forth,

4th, Combining with the yielding or spring bottom of an oiler, a stop applied in such a manner that such yielding part cannot be compressed beyond the limits of its elasticity, when said stop is applied and operated externally thereto, substantially as set forth.

5th, In oilers, provided with yielding or spring bottoms forming the sides of the reservoir and such yielding or spring bottom of one piece, substantially as set forth.

6th, Combining with the tube or nozzle and cover of an oiler, a reservoir the sides and yielding or spring bottom of which are formed in one piece, without joint or seam, substantially as set forth.

7th Combining with the reservoir of an oiler the yielding or spring bottom and the sides of which are formed of one piece a rigid exterior or shell provided with a suitable opening through which the yielding part can be compressed and operated, substantially as set forth.

2,687.—Steam Cock.—Albert Hallowell and H. R. Barker, Lowell, Mass. Patented Nov. 28, 1865.

1st, We claim in a stop cock in which the valve stem is operated by a valve key connected with a hand wheel, the arrangement of a ground joint, e f, the male part, e, being constructed upon the key, E, and the seat or female part in the cap, F, of the valve case, G, substantially as set forth.

2d, We claim the construction of the key piece, E, with its valvelike portion, e, with reference to the seat, f, in the cap, F, and the combination of the valve stem, b, and key piece, E, with a male and female screw thread whereby to operate the valve, A, substantially as set forth.

3d, We claim the arrangement of the hand wheel, I, tube, H, the screw, h nut, i, key, E, and cap, F, applied to the case, G, in combination with the ground joint, e f, substantially as described.

4th, We claim the arrangement of the annular groove, K, with the ground joint and key, E, and cap, F, combined with the valve and its case, substantially as described.

2,688.—Cooking Stove.—Daniel E. Paris, Troy, N. Y. assignee of J. R. Hyde. Patented March 24, 1863.

1st, I claim attaching or supporting a reservoir situated in rear of a diving flue cooking stove, to or by the rear part or end of the top plate of the stoves as and for the purposes herein set forth.

2d, So attaching the reservoir to the rear end of the top plate of the stove that its cover, or pieces that form its cover, shall be nearly level with the top surface of the stove thus practically forming an extension thereof, as and for the purposes herein set forth.

3d, The hot-air chamber between the front of the reservoir and the back plate of the stove closely covered by the top of the reservoir or the top plate of the stove or both together.

2,689.—Puddling Furnace.—Philip Keenan, and Edward O. Connor, Brownstown, Pa. Patented Nov. 14, 1865. Antedated Aug. 26, 1865. Reissued July 23, 1866.

We claim the use of pulverized ore and water in combination with fire clay when used for "fix" in the preparation of furnaces used for puddling or boiling in the manufacture of iron as herein described and set forth.

2,690.—Fix for Puddling Furnaces.—Hugh McDonald, Pittsburgh, Pa. Patented Oct 17, 1865. Reissued January 23, 1866.

I claim the use of pulverized iron ore as a fix for puddling or boiling furnaces when mixed into a pasty mass with water or other suitable liquid.

Also pulverized iron ore combined with carbonaceous matter and made into a pasty or adhesive mass, and used as a fixing for puddling or boiling furnaces.

2,691.—Embalming Dead Bodies and Carcasses.—G. W. Scollay, St. Louis, Mo. Patented Jan. 22, 1867. Antedated Jan. 19, 1867.

1st, I claim embalming dead bodies and carcasses and preserving them from putrefaction by introducing antiseptic gas or gases into the arterial or vasular system, substantially as described.

2d, Embalming dead bodies and carcasses or preserving them from putrefaction by the introduction of antiseptic gas or gases into the bowels, stomach, or lungs, substantially as set forth.

3d, Embalming dead bodies or carcasses or preserving them from putrefaction by combining the internal and external application of the gases thereto, substantially in the manner described.

Designs.

2,705.—Oilcloth.—J. T. Webster, New York City, assignor to Deborah Powers, A. E. Powers, and N. B. Powers, Lansingburg, N. Y.

2,706.—Eyelet.—James C. Merritt (assignor to himself and Oscar J. Merritt), New York City.

2,707.—Trade Mark.—James S. Waters (assignor to the St. Louis Lead and Oil Company), St. Louis, Mo.

2,708.—Buttonhole for Cuffs, etc.—Jarvis R. Wood, Fitchburg, Mass.

Note.—Fifty-one patents in the above list were obtained through the office of the Scientific American Patent Agency.—Eds.

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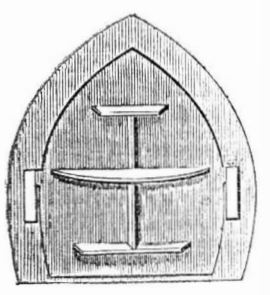

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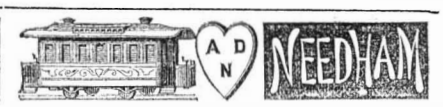

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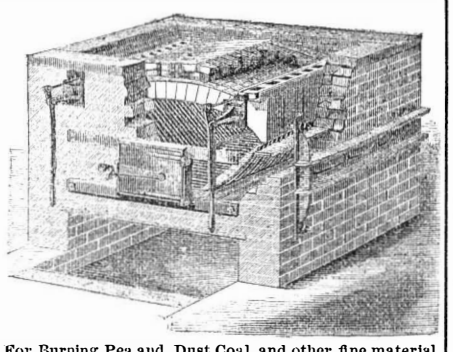

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PATENTS

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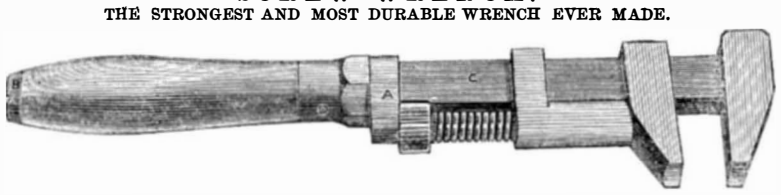

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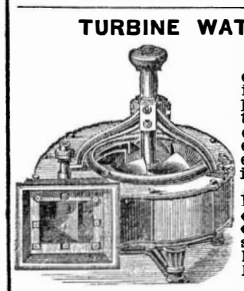

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The rapid progress of the Union Pacific Railroad, now building west from Omaha, Nebraska, and forming, with its western connections, an unbroken line across the continent, attracts attention to the value of the First Mortgage Bonds which the Company now offer to the public. The first question asked by prudent investors is, "Are these bonds secure?" Next, "Are they a profitable investment?" To reply in brief:

1st. The early completion of the whole great line to the Pacific is as certain as any future business event can be. The Government grant of over twenty million acres of land and fifty million dollars in its own bonds practically guarantees it. One fourth of the work is already done, and the track continues to be laid at the rate of two miles a day.

2d. The Union Pacific Railroad Bonds are issued upon what promise to be one of the most profitable lines of railroad in the country. For many years it must be the only line connecting the Atlantic and Pacific; and being without competition, it can maintain remunerative rates.

3d. 376 miles of this road are finished and fully equipped with depots, locomotives, cars, etc., and two trains are daily running each way. The materials for the remaining 141 miles to the eastern base of the Rocky Mountains are on hand, and it is under contract to be done in September.

4th. The net earnings of the sections already finished are several times greater than the gold interest upon the First Mortgage Bonds upon such sections, and if not another mile of the road were built, the part already completed would not only pay interest and expenses, but be profitable to the Company.

5th. The Union Pacific Railroad Bonds can be issued only as the road progresses, and therefore can never be in the market unless they represent a *bona fide* property.

6th. Their amount is strictly limited by law to a sum equal to what is granted by the U. S. Government, and for which it takes a second lien as its security. This amount upon the first 517 miles west from Omaha, is only $16,000 per mile.

7th. The fact that the U, S. Government considers a second lien upon the road a good investment, and that some of the shrewdest railroad builders of the country have already paid in five million dollars upon the stock (which is to them a third lien), may well inspire confidence in a first lien.

8th. Although it is not claimed that there can be any better securities than Governments, there are parties who consider a first mortgage upon such a property as this the very best security in the world, and who sell their Governments to re-invest in these bonds—thus securing a greater interest.

9th. As the Union Pacific Railroad bonds are offered for the present at 90 cents on the dollar and accrued interest, they are the cheapest security in the market, being 15 per cent less than U. S. Stocks.

10th. At the current rate of premium on gold, they pay

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